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VOLUME XVIII. SAN FRANCISCO, CAL., JUNE 29, 1907 No. 26

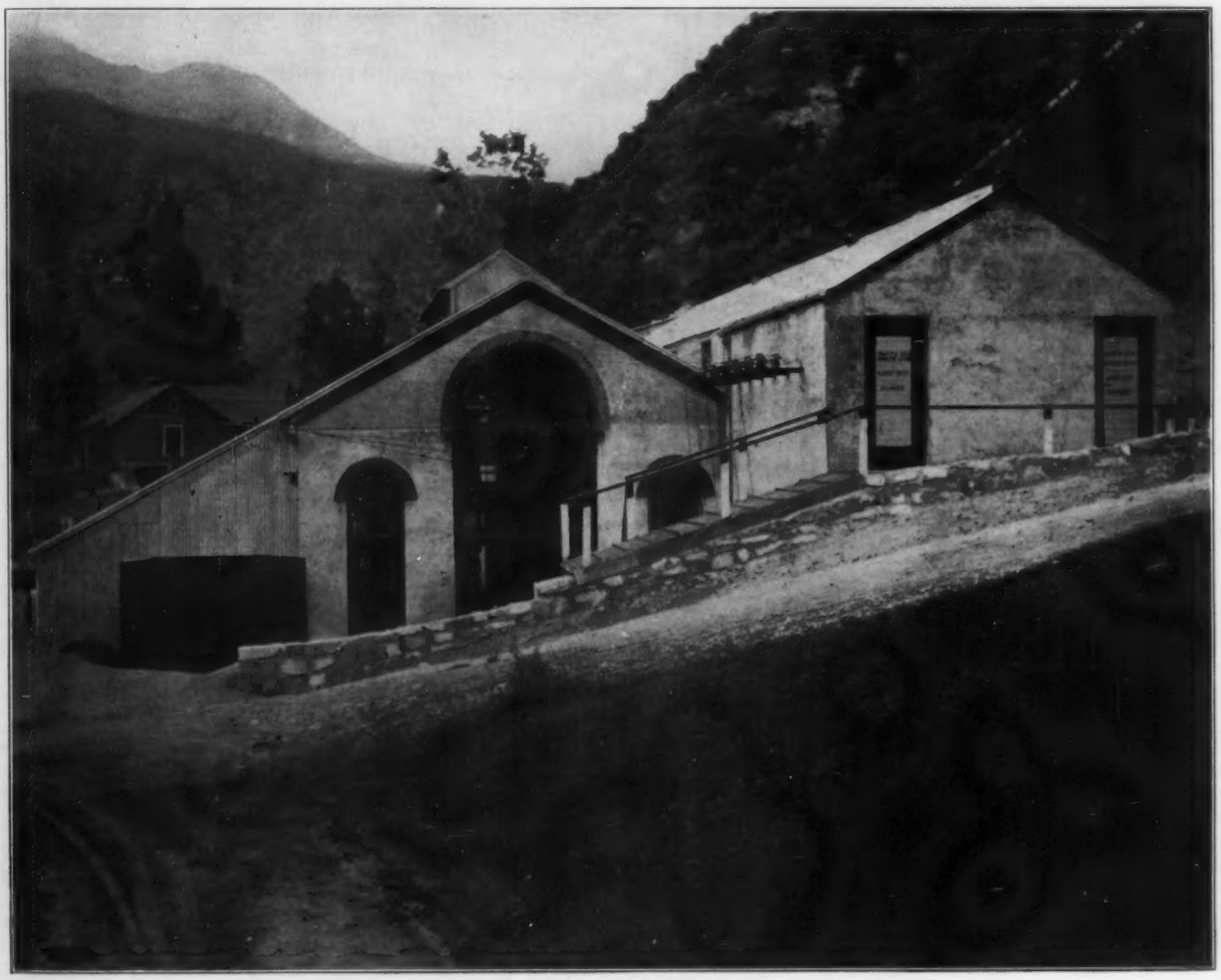
AZUSA STATION, PACIFIC LIGHT AND POWER CO.

The power house at Azusa is one mile north of Azusa near the San Gabriel River. This plant was the first hydro-electric power plant built by the Pacific Light and Power Company and is now used as the control station for the whole system, all the lines from the different plants coming through this station.

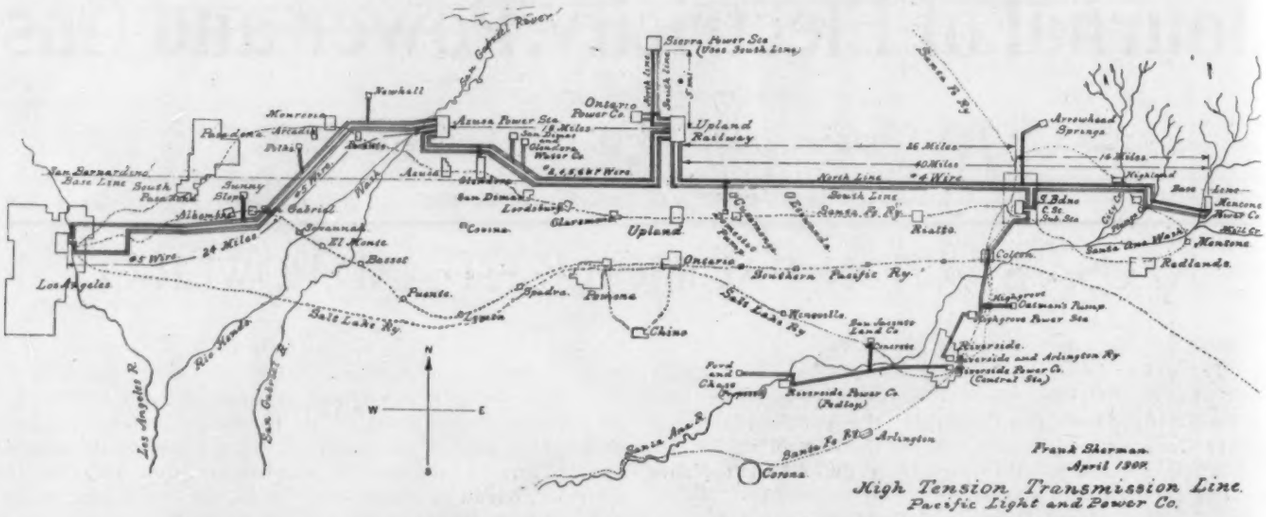
Head Works and Conduit.

The intake was planned at a narrow place in the San Gabriel River about seven miles above the power house site. Concrete piers were sunk in the river bed at this point, and the flow of water, governed by flash boards between the piers, runs directly into the tunnel, which emerges from a jutting bluff of solid rock into the river. The water is conveyed to the forebay through a conduit system seven miles in length, consisting of tunnels and modern flumes. The tunnel which carries the water two-thirds the distance was driven by hand through solid rock, the surface being plastered to present a uniform surface area. That part of the conduit from the end of the tunnel to the forebay consists of wood-stave pipe, five feet in diameter, bound by round steel hoops, the entire pipe being encased with concrete eighteen inches thick.

The forebay is situated on the hillside 404 feet above the power house. The pressure main, consisting of thirty-eight inch riveted steel pipe, is protected by a grizzly where it enters the forebay to caach all debris which can be easily raked off. Two spillways were constructed to handle the excess water, or, in case of a shut-down, to carry away the full head. One of these which carries excess water is built straight down the hill to the waste way. Owing to



SOUTH END OF AZUSA POWER HOUSE – SHOWING BUS GALLERY.



the slope of the hill, which is on a 45-degree angle, the other one which is used to carry the full stream in case of a shut-down, is constructed with three water pockets to break the force of the full head of water which it carries.

Power House and Equipment.

The power house is constructed of reinforced concrete with corrugated roofing. Four 300-kilowatt, Westinghouse, 50-cycle, 2-phase, 500-volt generators, running 430 revolutions per minute, are installed direct connected to four double Pelton water-wheel units, the wheels having two discs per unit. Two of the units are governed by Lombard Type "F" governors, while the other two are hand controlled. Belt-driven from the generators are four 7½-kilowatt, Westinghouse, direct-current multipolar, 125-volt generators used as exciters.

The transformer room, above which is the bus gallery, is situated on the uphill side of the building, running its entire length and extending at the north end, where is located the air compressor and an auxiliary pump for circulating the water in the transformers and around the bearings should the gravity water system be tied up. In this room are eight 200-kilowatt, Westinghouse, oil-insulated, water-cooled, 50-cycle, step-up transformers, stepped up by the Scott connection from 500 volts, 2-phase, to 17,500 volts, 3-phase.

About three miles south of Azusa is located the Covina sub-station, through which power and light is supplied to Covina and the adjoining country. This building is not shown in the map, having been built in November, 1906, and is just now nearing completion. It contains three 37½-kilowatt, oil-insulated, air-cooled, 50-cycle, Westinghouse transformers, 15,000 volts stepped down by delta connection to 2200 volts.

At Glendora is another sub-station with the same equipment, supplying power to that vicinity, and a little further east the San Dimas and Glendora Water Company taps the north line for power. Power is also supplied to the Upland Railway Company through both the south and north lines. Just below the Sierra power plant is located the Ontario power house, which is tied into the high tension lines of the Sierra Power Company.

The accompanying cut is from a tracing made by F. W. Sherman, formerly of the Pacific Light and Power Company, and shows how nearly the transmission line follows the San Bernardino base line. There are two high-tension transmission lines called the north and south lines, with corresponding bus systems in each of the power houses and sub-stations. The north line is used in most cases as the feed line for power and light in small towns and vicinity, and for pumping stations. Several towns have been supplied with power since the map was completed and are not shown as being tied in.

Sierra power station is situated on Lydle Creek, not shown on the map. The Ontario Power Company's plant is tied in on both lines.

The south line only comes into the San Bernardino C Street sub-station and is carried down to Riverside. Since the Pacific Light and Power Company has taken over the Riverside Power Company, the line from the latter company's plant has been tied into the main system at Central Station in Riverside. A line has been run to a pumping station due north of Pedley within the last few weeks. The map was not drawn to scale from a survey, but it gives a very clear conception of the general route followed by the transmission line.

INSULATOR TEST.

A series of interesting tests of insulators has been completed recently in connection with the plans for the Ocean Shore Railway, which will parallel the shores of the Pacific Ocean for nearly eighty miles between San Francisco and Santa Cruz, California. The transmission line is to be operated at 33,000 volts in connection with various sub-stations distributing the power along the line. It will be close to a dusty county road for much of its length and is exposed to salt spray from the ocean in several places. Consequently there is great danger of burnouts caused by the insulators becoming coated with dust from the road and salt from spray and fog.

In order to save time the test was conducted under artificial conditions approaching the natural as closely as possible, except in regard to time duration. "Fog boxes" were tried. The insulators included a 16-inch, 60,000-volt porcelain with corrugated top, a 14-inch, 60,000-volt, smooth top, a 9-inch top 35,000 volt porcelain, a Kern type insulator and one of special design.

The results showed that such insulators must be cleaned every third or fourth year if used for 33,000 volts or over. The "fog boxes" increased the time between cleanings for the smaller insulators but were impractical for the larger on account of size and expense. The fog caused but little trouble, the main difficulty beingexperienced with salt and dust. An insulator that would probably prevent arcing is one made up of several pieces of porcelain or glass shaped like the ordinary insulator tops and placed one below the other, exposing a large part of the surface to wind action. A flat top is advisable.

SALES CONTRACTS.*

B. A. Brennan.

It is well known that those charged with the duty of making and approving contracts are oftentimes meagerly alive to the fundamental features of contractural obligations, and if one were to study the subject, observing the faulty character of most contracts and considering the tremendous volume of business which is transacted under such contracts with comparatively little complication and misunderstanding, it would, of necessity, make him an optimist. His recognition of the evidence that most business is conducted on faith, with an underlying spirit of confidence pervading most commercial transactions, would convince him that most people are honest, and demand merely that to which they are entitled. It will not be disputed, however, that contracts are necessary as a record of understanding, and they are necessary, too, as a precaution to both parties. On the first count, they should be specific in the expressed terms, and in the second instance, they should, by observing all necessities of the business, protect both parties from the risks, liabilities or penalties which, in spirit, they are not to assume, nor can they afford to assume, and which otherwise, either through ignorance of equity, or direct intent, would be forced upon them. It is not the salesman alone, nor the officer who passes upon the form, who requires to know how a contract should be drawn and its provisions interpreted. A contract once made, may require the participation of many in its execution, and every man connected with a business is obligated, both to himself, his employers and associates, to familiarize himself with the general legal regulations covering business intercourse or business agreements.

In the consideration of this subject, it must be remembered that statutory provisions exist in most States, and that the same differ widely in character with respect to the technical provisions of form and procedure.

Every one knows that a contract is an agreement, but how many of us realize that an agreement is not always a contract? It might be a contract, but to be so, it must possess certain elements which are required by law. An agreement is simply the meeting of minds; whereas, a contract is an agreement between parties, which, for a consideration from one to the other, creates an obligation on each to perform his respective covenants. Every agreement is not enforcible. To be enforcible, it must contain the legal elements known as "competent parties," "mutual assent," "lawful subject-matter," and "sufficient consideration." All of these are necessary to a perfect contract, and the absence of any one of them affects the contract. In some instances, depending upon the nature of it, the absence of any one of these elements makes the contract unenforcible; in others voidable, and in still others, absolutely void.

There must be, at least, two parties to a contract, and they must be competent. By "competent" is meant natural persons or corporations with legal right of contracting.

NORTH END OF AZUSA POWER HOUSE—LINES LEAVING POWER HOUSE

*The "Electric Journal."

Natural persons, in this sense, are those of legal age, and those who are not incapacitated by physical or mental conditions which exclude consent, or by law or statute which prevents certain persons from entering into contracts or restricts their power to do so. The legal age of males is twenty-one years, and the same in most States for females, although in some States the legal age of females is eighteen years. Persons under age are termed minors. As a rule, contracts with minors are voidable, the idea of such law being to protect those under age against the consequences of their own discretion or against the imposition of others. Minors are liable, however, for all necessaries of life. Other persons not competent parties to valid contracts are:—convicts during the continuance of their conviction, insane persons, or those who can prove that they were non compos mentis at the time of contracting; persons intoxicated, or under the influence of drugs, so as to be deprived of consciousness of what they were doing at the time of contracting. Corporations usually have the same power of contracting as natural persons, but contracts made by them must be either expressly or impliedly authorized by their charter or act of incorporation.

Mutual assent is the meeting of minds. Obviously, there can be no contract if there is no agreement, and unless the parties have in mind the same understanding, with the common intention of binding themselves and each other by the arrangement, there can be no agreement. However clear the agreement may appear on its face, it can be conclusively shown that it was not mutually understood, it cannot, in general, be enforced. The parties must communicate to each other their common intention, and no contract which the law will recognize and enforce exists until the respective parties have agreed upon the same thing and in the same sense.

Every contract must necessarily be the result of an offer on one side and its acceptance on the other. The acceptance must be in a simple and direct affirmative, and if the party receiving the proposal accepts it on any condition, or with any of its terms or provisions changed, unless the same be altogether immaterial, it amounts to another proposal by the other party, and there is no contract until the party making the proposal consents to the modification, either in writing or by overt acts amounting to the same thing. To be certain of proper mutual assent, every agreement should be written and signed by both parties and everything agreed upon should be written distinctly. Care should be used to say all that is meant and nothing else, for it is a rule at law that no oral testimony shall control a written contract unless its wording is so ambiguous as to practically demand definition of intention, or unless fraud can be proven. As a rule, any contract may be altered after execution, by consent of the parties, and any changes made at the time of or prior to the signing of the contract become elements in it. Any changes, however, after execution makes a new contract out of the original, and accordingly any guarantor, or third party to it, not assenting to the change is released from his obligation.

In the absence of fraud, a person is bound by his written agreement, notwithstanding he may have misapprehended the legal effect of it. Parties to contracts are assumed to know the liabilities imposed upon them by law. In order to charge one who can neither read nor write, with liability under a contract, it must be shown that the contents of the paper were fairly read or explained to him. A party negligently signing a contract without reading it cannot avoid it by claiming afterwards that it contains provisions he did not understand or know of at the time of execution. Fraudulent representations made prior to the consummation of a contract, operating as an inducement thereto, and relied upon by the party to whom made, will defeat recovery by the party making them. Likewise a contract obtained under duress is void.

The subject-matter of a contract is the basis of the contract itself, and is descriptive or applicable to the promises of the parties, comprehending both the consideration to each and their respective obligations. Lawful subject-matter, as implied from its title, requires that the basis of the contract shall be of legal character, and that the agreement itself shall otherwise conform to the legal requirements. The law refuses and forbids contracts involving agreements to perform an act forbidden by statute, or acts which in the law are penalized. Under this category would come agreements to pay usurious interest, contracts of wager, contracts for services of one who sets himself up as a physician who has no diploma, contracts made on Sunday, contracts to commit crime, civil wrong, or fraud on creditors. The law also forbids contracts opposed to public policy, as being injurious to the interests of the public. These are generally classed under agreements which tend to injure the public service, and of which graft is a striking example; agreements tending to obstruct the course of public justice, such as agreeing to suppress evidence at a trial; agreements tending to encourage litigation; agreements contrary to good morals, those restricting the freedom of trade, or those affecting the security of property and life.

It is difficult to clearly define Consideration as applied to contracts. Generally speaking, however, it consists of the reciprocal and mutual promises between the contracting parties. It might be called the benefits which each party receives, or the something to be performed or given in exchange by one party to the other for the inducement. The law says that consideration of some legal character is absolutely essential to a valid contract, and it further says that the consideration must be valuable and good, and must consist of some benefit, interest, right or profit to the parties, which denotes some substantial cause for the promise. For example, if A owes B $100, and B tells A he need not pay it, B can afterwards, nevertheless, repudiate his concession, on the score that there was no consideration for it.

Impossible conditions will void a contract; that is, where at the time the agreement is made it is known by the parties that a promise is physically impossible of performance. It must appear, however, that the promise cannot by any physical means be accomplished, and not that its fulfillment is deemed impossible because it is difficult and absurd.

In a sales contract the price is the consideration on one side, and the furnishing of the goods on the other. To constitute a sale, there must be something to sell. This does not mean that a concern could not sell or contract to deliver a turbine or generator not yet built, but that any hope or expectation of means, founded on a right in being, may be the subject of sale, because in such case there is a potential existence. But a mere possibility or contingency, not founded upon a right or coupled with an interest, cannot be made the basis of a valid contract.

Price in a contract of sale is essential to its validity, and must be either determined or determinable. It need not necessarily be paid down, but there must be an agreement to pay. In the absence of a fixed price, the law would imply a promise to pay as much as the property was reasonably worth. If the contract be silent as to the time of payment, a cash sale will be presumed.

Every agreement must necessarily result from an offer or proposal on one side and an acceptance of it on the other. To illustrate: The sending of an order to a merchant or manufacturer is an offer to purchase, and the sending of the goods is the acceptance of the offer and creates the contract. The entering of a street car and riding in its amounts to an agreement by the railroad to carry the person on the usual route, at the usual fare, and an agreement by the passenger to pay the usual fare. A man, with full knowledge of another, does work for him, the latter knowing that he expects to be paid for it; the doing of the work is the proposal and the receiving of the work without

dissent is the acceptance. If a man sends goods to another, and the other accepts the goods, or uses them, it implies a contract, and the user is liable for what the goods are worth.

In the preparation of a contract, it is important that it be grammatically written and construed according to the rules of grammar. This is not, however, an absolute rule at law, as it is not material in what part of the instrument any clause is written. It will be read as of any place and any context, so long as its certain and evident intent requires it. It is dangerous, however, to permit inaccuracy or confusion in the arrangement of clauses, because the true intent may thus be distorted and not admit of ready construction. There are many words and phrases which have one meaning in ordinary narration, but quite another when used as technical description, or words in relation to some special subject, and it must be supposed that the words as used are in the specific and technical sense applicable to the subject. In the construction of contracts, the main idea is to determine the intention of the parties, and it is a rule that the whole contract shall be considered in determining the meaning of any and all of its parts.

Contracts are often construed by the courts as including all matter which it is clear the parties intended, whether expressed or not, and to contain not only the expressed agreements but those implied as well. That is to say, usages or customs of a country may affect the meaning of certain words. How plainly this would apply to engineering questions, where usages and practice may affect the meaning of certain words, and where incidents universally attaching to the subject-matter must be presumed to have been in contemplation by the parties. It is settled law that every trade has its usages and that these usages are a part of every contract with reference to the subject-matter.

In the interpretation of contracts of which a part is printed and part written, the printed parts are subordinated to that written, if they are in conflict and tend to different results. Mistakes in contracts can be rectified, if it can be proven that the parties intended to use one word, but used another by mere verbal error in copying or writing.

Contracts made on Sunday are governed by the laws of the particular State, but, generally, contracts executed on Sunday or legal holidays are void.

Contracts and bargains can be, and frequently are, concluded by written correspondence. An offer having been made through the mail, the proposing party may be regarded as tendering the postoffice as his messenger, and when the other party accepts by post the agreement is complete and the contract made. The party to whom the proposal is sent must accept and mail his acceptance in due season, and if the one proposing desires to retract or modify it, he must communicate it to the party addressed before said party has mailed his acceptance, otherwise the proposer is bound. The proposer may, however, stipulate in the proposal that it shall not be considered as binding until the acceptance is actually received.

A salesman is usually authorized to do the specific thing of selling, being furnished with contract or proposal forms.

Frequently the salesman or engineer has occasion to go out and confer with customers relative to the details of contracts or the specifications. His company, wishing to have him received with standing, advises the customer that Mr. So and So will call, etc., and instead of restricting his authority, rather emphasize it to some extent. How many of us appreciate that by simply doing this, the company may equip the salesman with authority to obligate it to an extent which may involve great expense? How many of us realize that on such occasion a mere word or admission, the customer will permit of its ready installation without or assent, might bind the company beyond any degree of reason. The law says that unless the principal shall in some positive way notify the other party of the limit of the authority of his salesman or agent, he may be bound to the full extent of the salesman's acts; for a principal is responsible for the acts of his agents not only when he has actually given full authority to the agent to act for him, but when he has by words or acts, or both, caused or permitted the person with whom the agent deals to believe him clothed with this authority; and, if the agent transcends his actual authority but does not act beyond the natural and usual scope of business, the principal is bound, unless the party with whom the agent dealt knew the agent exceeded his authority. If a customer can prove that a salesman made certain promises or certain statements at the time the contract was entered into, thereby substantially interpreting the spirit of the contract, the law would interpret such verbal promises or statements to be collateral to the agreement, and on which the customer could place valid claims.

The matter of terms of payment under a contract is one of its most important features, and we all know that the machinery manufacturer is oftentimes compelled to furnish apparatus for which he does not receive full payment on shipment. The general rule on small product is about one-half of the purchase price on shipment; the remainder thirty days after shipment; although, in some instances, where the customer is not strong financially, payment before shipment is often exacted. On larger product, where the building of the apparatus requires any length of time, during which period a large amount of money is necessarily tied up in raw material, a portion of the purchase price is usually made payable as the work progresses in the shop; another payment when the apparatus is substantially completed in the shop, and the third payment on shipment, or delivery, with the balance within a reasonable time thereafter.

The all-important consideration in contract terms is that they be specific. A contract is always faulty, the terms of which permit of diverse interpretations, and oftentimes extended terms are less objectionable if they be clear and unquestionable, than short terms with an uncertain basis of maturity. The greatest conceivable defect in expressing terms of payment would be to have them dependable upon the customer's temperament, mood, or, perhaps, caprice. The employment, therefore, of such terms as "satisfactory operation," "erected complete," "tests to verify guarantee," "when in successful operation thirty days," or, in fact, any contingency which would permit the customer himself to define the terms contrary to the seller's intention or the spirit of the contract is dangerous and costly and should not be used.

APPARATUS FOR GENERATING ELECTRIC POWER.*

y JOHN HARISBERGER

In my first lecture I mentioned that when transforming and transmitting energy of a waterfall for a distant market, loss of power occurs. To keep this loss at a minimum is necessary for profitable commercial results.

I have also described how the power of a waterfall can be transformed into mechanical energy with very little loss. We now come to the point where it must be decided into what form the mechanical energy must be changed so it can be transmitted a long distance at minimum loss. It has been proven that power in the form of electricity can be transmitted at less loss than any other way.

Apparatus for generating electric power, when it is intended for long-distance transmission, generally consists of alternating current dynamos, exciters and their accessories for controlling and metering the power. Transformers for raising the electric pressure may also be included. The amount of power and the distance to be transmitted will determine as to the advisability of using transformers.

There are three types of alternating-current dynamos in practical use—the revolving armature machine, the revolving field machine and the inductor type. The revolving field machine has proven the most satisfactory in many classes of work, as it permits the conductors to be thoroughly insulated and they are not subjected to the strains and vibrations as if they were on the rotating part. This is important, especially for high voltage machines; there are no collectors or brushes to insulate for high pressures as in the case of revolving armature generators, as the voltage of the field current in general practice is seldom more than 125 volts. Inductor alternators for equally good voltage regulation must be heavier and more expensive than the revolving machine. For a given amount of material and given cost, the revolving field machine shows higher efficiency and better regulation than either revolving armature or inductor types.

Armatures for alternating-current dynamos are wound for either one-, two- or three-phase. Single-phase have one winding; two-phase two distinct windings so placed that the voltage in the two windings will differ ninety degrees. In three-phase alternators there are three windings inter-connected in such manner that the voltage between terminals differ in phase 120 degrees. The usual method of inter-connecting the three windings is delta Δ or star Y. Except where existing single-phase or two-phase systems necessitate clinging to the old type, generators are now wound for three-phase, and for long-distance transmission other than three-phase should not be seriously considered. With a three-phase generator when armature is Y connected the voltage between line wires is $\sqrt{3}$ times the voltage of one winding and the current will be the same. When delta connected the voltage between line wires will be the same as in one winding, but the current will be $\sqrt{3}$ times as great in the winding as in the line. The static capacity in a delta winding for a given line voltage will be greater, as it requires a larger number of turns per phase than the Y winding, and there is consequently a larger percentage of slot space occupied for insulation. With a delta connection the phases form a closed circuit, and if the voltages are unbalanced, on account of unequal field strength or different number of turns per phase in winding, local currents can circulate in the armature. In a Y-connected armature two-thirds of the winding may be burned out during a bad short circuit, while in a delta probably only one-third.

The voltage for which generators should be wound depends upon their output. They are built anywhere from 440 to 15,000 volts, and may be built for voltages as high as has proven satisfactory for air-blast transformers, especially the stationary armature type. The higher voltage machine may be used for moderately long-distance transmission without the use of step-up transformers. For a given frame, the armature wound for the higher pressure, the cost will be greater than for low voltage on account of additional insulation and increased cost of construction. The output will also be reduced because of the increased space occupied by insulation.

If distance of transmission is not great, choice of frequency will depend on nature of load to be supplied; if it is mostly lighting, 60 cycles; if mostly power, 25 cycles. As far as generator is concerned, frequency depends only on the speed and number of poles. It is not influenced in any way by the style of armature winding or the method of connecting winding. Cycles per second =

$$\frac{\text{number of poles x speed per minute}}{120}$$

When deciding on a frequency for very long distance transmission, the transmission line must be given consideration, as the lower the frequency the better the regulation and the greater the capacity of the line, and the lower the frequency the less the charging current for a given voltage. Therefore, to transmit a given amount of power for a given loss, the transmission line would cost less for twenty-five cycles than for sixty cycles, but in total cost of system this would be partly offset by the extra cost of transformers and generators for twenty-five cycles than for sixty cycles.

In my last lecture* I stated that I would let the water-wheel builder choose speed for wheel and have speed as high as he could get the best efficiency, and then have generator built to suit this speed. The best frequency for a generator depends on the speed at which it is driven and on its capacity; this will also influence the choice of frequency. For a given capacity, low frequency for low speed and high frequency for high speed is desirable for generator, as far as cost and design is concerned. As to transformers the higher the frequency the smaller the weight and cost and the higher the efficiency.

Regulation of generators for transmission of power should be such that the voltage will not rise to too great a value on sudden opening of receiver circuit, speed and excitation being constant. Less careful attendance is necessary, as the change in exciting power for variation in load and power factor is less. Induction and synchronous motors may be thrown on the line with less disturbance, and excessive rise of voltage due to charging current prevented. Seven per cent regulation for generators seems to be good practice. Take a generator having 7 per cent regulation, running at full load, 100 per cent power factor, 2000 volts; when full load is thrown off, speed and excitation being constant, it will rise to 2140 volts. 2140—2000=140, or 7 per cent.

On a transmission system there is much line exposed, increasing the possibility of interference causing short circuit. This should also be considered, when deciding on regulation of generator, since good regulation implies a large current on short-circuit, and poor regulation the reverse is true.

When an alternator is running at no load the voltage remains constant; as soon as load is put on, voltage drops, excitation and speed being kept constant. This drop is due to three causes: Armature resistance, armature self-induc-

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Lecture delivered to the students in Electrical Engineering, University of Washington.

tion and armature reaction. The drop due to resistance is a matter of cross section of conductors in armature winding. To keep down self-induction is a matter of arranging the armature conductors and core, as part of the generated voltage is used to overcome the self-induced voltage in the armature winding; it is a detriment to good regulation Armature reaction is the effect the armature current has on the field at different power factors; for instance, a load of 100 per cent power factor, or nearly so, as incandescent lamps, the current is nearly in phase with the voltage and affects the field only by distorting it, but causes very little drop in the voltage. Any drop in voltage under these conditions is caused mostly by the resistance and self-induction in the armature winding. When the load is inductive, so that it causes the current to lag behind the voltage, the field created by the armature current opposes the original field and tends to weaken it; this causes a drop in voltage, which varies according to power factor of load. When load is of a nature, such as over excited synchronous motors or transmitting power over a long line having large capacity that it causes the current to lead in relation to voltage, the effect will be the reverse, making the voltage rise instead of drop.

One method to reduce armature reaction is to make the field very powerful as compared with the armature. Arrangement of poles and shape of poles also influence the reaction effects of alternators.

The shape of the poles will also, to a certain extent, determine the wave-form of the generator. This should be a sine curve and generators that are to be run in multiple should have wave-form alike for best operating results. The wave-form is somewhat distorted by energy passing through transformers, motors, etc., and capacity of line, transformers and armatures is also an element that tends to distort shape of wave. Any apparatus generating a counter electro-motive force should have the same wave-form as generator supplying system from which it is fed, so it will tend to correct the distorting action.

To be able to run alternators in parallel is always desirable and generally necessary. The disturbing causes for operating in parallel are variation in angular velocity of prime mover and having electrical circuit connecting alternators together of too high an ohmic resistance. The remedy for the circuit is obvious, and as water wheels only are considered for prime movers there will be no variations in angular velocity to cause trouble.

When distance of transmission is more than fifteen miles, step-up transformers should be used to keep down cost of transmission line, as voltage necessary would be too high for generator to transmit a large quantity of power farther than this distance, with efficient results. It occasionally is desirable to use step-up transformers for much shorter distance to protect generators. In localities where lightning disturbances are very severe, it is probable that apparatus will occasionally be crippled. The apparatus connected direct to transmission line will be the first to suffer, and to have a transformer out of commission is not so serious as a crippled generator; besides an extra transformer is not so expensive as an extra generator. Transformers may be divided into two general classes according to the arrangement of the core and winding. The transformer where the iron surrounds the winding is called the shell type, and when the winding surrounds the core it is called the core type. Large transformers are generally of the shell construction because it is easier to secure good mechanical arrangement of the coils, and coils can be sandwiched and arranged so good circulation of oil can be obtained with better effects as to regulation than with the core type.

Step-up transformers in transmission plants should have the best regulation possible as short-circuit current of station can be kept at safe limit by proper design of generators; therefore, shell-type transformers will be preferable.

Transformers are either air-cooled, oil-insulated and air-cooled, or oil-insulated water-cooled. For a water-power plant I can imagine no good excuse for other arrangement than oil-insulated water-cooled, especially when water under pressure is available for circulating through cooling coils, as temperature can be better controlled at overloads than with the other arrangements, and transformers will be lighter and lower cost. Transformer groups may be connected either delta or Y. The transmission line voltage generally will determine the kind of connection to use. Up to and including 35,000 volts the delta connection is desirable and would be for any voltage for one reason, and that is in a case when one transformer of the delta is crippled the other two can be connected in V and will transform three phase current to their full capacity, less 15 per cent continuously. The strains upon the insulation of transformers are the $\sqrt{3}$ times as great with the delta connection as with the Y; therefore, the Y connection is desirable for the higher voltages. With the Y connection neutral should always be grounded so as to prevent it from shifting, for disturbance of the whole system may be caused by the neutral drifting and making possible a dangerous rise of potential.

Exciters should not be overlooked when designing a power station as they are some of the vital parts of the plant. There should be at least two exciters for a plant having more than one alternator and each exciter should be of such capacity so as to be able to take care of at least three alternators when intended for a station containing three or more generators. In a station containing ten

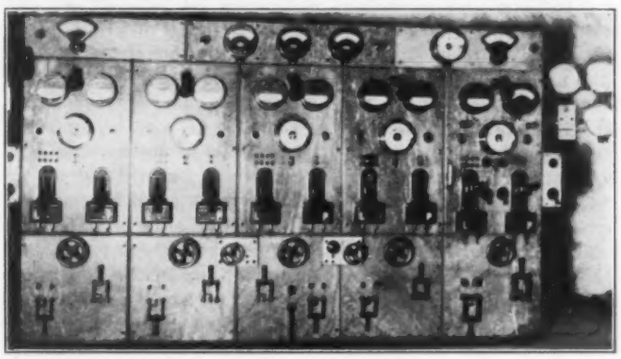

FIG. 1.

be able to take care of total of plant. Exciters should be wound for constant voltage, and when driven by induction motor, drop in speed of motor from no load to full load should be considered when designing compound winding for exciter to maintain constant voltage. In high head plants openings in nozzle tips of exciter wheel are of such size that a small obstacle may shut off the water. In a case of this kind it is good practice to have an electric motor connected to exciter in addition to water-wheel, so in case nozzle tip chokes up, speed of exciter is kept up by motor, which will be driven by current derived from alternator bus.

Figure 1 shows switchboard in generating station at Snoqualmie Falls. From this board are controlled five alternators and their water-wheel governors, also speed and voltage of two exciters and high tension line switches.

Generators are 3-phase, 60 cycles, 2000 volts.

Voltage of transmission line, 33,000.

Rated capacity of station, 12,000 kilowatts.

THE ECONOMIC STATUS OF THE ELECTRIC FURNACE.

By Wilder D. Bancroft.*

In the arc light and the incandescent lamp we have electricity used primarily as a source of light. At the same time there is a great deal of heat developed and these two forms of lamp correspond to the two types of electric furnace, the arc and the resistance furnace. These names in themselves describe the furnaces, the heat being generated in the arc in the first type, while in the second type the heat is caused by the passage of the current through a conductor which may be either solid or liquid.

When electricity is generated from coal, electrical heating is necessarily much more expensive than heating direct from coal, because we have the losses in the steam engine, the losses in the dynamo, and the losses in transmission and conversion. When electricity is generated from water power, the difference in cost may be less and cases are conceivable in which electrical heating might be cheaper, unit for unit, than heating from coal. Under any ordinary circumstances, however, we must accept the fact that electrical heating is an expensive form of heating and that the difference in cost must be overbalanced by some special advantage if the electric furnace is to compete commercially. When Cowles, a Cornell graduate, started to build a commercial electric furnace in 1884, he was laughed at on the ground that electricity was much too expensive a fuel.

Some possible advantages of the electric furnace are easily seen. With the arc furnace we get an intense concentration of heat with a correspondingly high temperature. With the resistance furnace we can regulate the supply of heat within very wide limits. By decreasing the cross-section of the resistor we can concentrate the heat at a particular point if necessary, though not to the same extent as in an arc furnace. By a suitable design of the resistor we can ensure a fairly unform distribution of heat throughout the length of the furnace. Since the heating is internal the problem of containers ceases to be a troublesome one and the outside of the furnace may consist of the unfused charge or of the chilled and solidified melt. Of course, in some cases of chemical heating, such as the rotary cement kiln for instance, we have internal heating; but this is by no means always possible. When we have external heating, the container must be less fusible than the charge because it is heated to a higher temperature. Apart from these two points of the greater flexibility of the current and of the advantage of internal heating, the electric furnace owes its commercial superiority to one or more of the following causes: the ability to reach temperatures inaccessible by other methods; the possibility of larger units and consequent decrease in costs; the greater purity of the product; increased reaction velocity due to a higher temperature; possibility of using cheaper raw materials owing to new reactions taking place at higher temperatures. As a matter of fact, each one of these is a factor in the successful manufacture of some product by means of the electric furnace.

When considering the economic status of the electric furnace, we must always keep in mind what is the nature of the competition which it has to face. Speaking broadly, the product of an electric furnace will have to compete with a natural product or with a manufactured product unless it happens to be a substance the like of which was not known before, in which case a demand must be created for it.

Let us consider a number of typical cases, showing what it is that enables the product of the electric furnace to compete successfully. First on the list comes graphite which is made at Niagara Falls in 1000-horsepower resistance furnaces. The temperature required is so high that it can be reached only in the electric furnace. Graphite competes with carbon electrodes and with natural graphite. Graphite electrodes cost more than carbon electrodes, but the difference in cost is more than counterbalanced in some industries by the lesser disintegration and longer life of the graphite. In so far as Acheson graphite competes with the natural product, the difference in cost is balanced by the greater purity of the artificial graphite.

Carborundum, SiC, is made by heating sand and coke in a 1000-horsepower resistance furnace. Owing to the high temperature necessary, the substance can not be made commercially by chemical heating. It does not occur in nature, so far as we know, except as microscopic crystals in some meteorites. Its chief use is as an abrasive and it competes with natural emery, and also with alundum, which is an artificial emery. Carborundum costs more than natural emery, but the difference in cost is balanced by the extra hardness and superior grinding power. Since alundum is made in the electric furnace, its competition with carborundum lies outside the scope of this paper.

Calcium carbide, CaC_2, is made in this country by heating lime and coke in 250-horsepower arc furnaces. In the Austrian Tyrol it is made in resistance furnaces. The temperature required is above that which can be reached successfully on a commercial scale by strictly chemical methods. Calcium carbide does not occur as a natural product and at present its sole commercial value depends on the fact that it reacts with water to form acetylene. The carbide industry, therefore, depends on the demand for acetylene. While calcium carbide is a powerful reducing agent, its cost is prohibitive.

If nitrogen be passed into a calcium carbide furnace, a product is formed which is called calcium cyanamide, $CaCN_2$. This can also be formed by passing nitrogen over calcium carbide heated to 1000°-1200° C; but this requires two operations and is therefore apparently not so satisfactory a method. This calcium cyanamide is a product not found in nature and it is to be used as a fertilizer, competing with sodium nitrate and ammonium sulphate. In the past the world's supply of nitrates for fertilizing purposes and for nitric acid has been drawn from the beds of Chili saltpeter in South America. The consumption of nitrates is increasing enormously every year and there is reason to fear that the saltpeter deposits will be exhausted by about 1940. In consequence the price of Chili saltpeter is rising rapidly. Five years ago calcium cyanamide could not have been manufactured at a profit; it is not certain that it can be manufactured at a profit today. If the price of sodium nitrate continues to rise, there will come a time when calcium cyanamide can compete successfully. The only doubtful factor is whether the supply of ammonium sulphate from coal will be sufficient to supply the world's needs at a price below that at which the calcium cyanamide can compete. There is no definite information as to this, but it is reported that the manufacture of calcium cyanamide is soon to be undertaken on a large scale at Spray, N. C.

While ammonium sulphate and calcium cyanamide, together with nitrogen-fixing bacteria, may supply the demand for nitrogen as a fertilizer, there is still the demand for nitric acid to be considered. It may be that this will be met by some method of oxidizing ammonia; but there is another way that is theoretically possible. In the atmosphere we have practically an inexhaustible supply of nitrogen. If this can be made to combine with oxygen, we can get oxides of nitrogen which can afterwards be converted into nitric acid. For over a century it has been known that oxides of nitrogen could be formed by the passage of an electric spark in air; but the difficulty was to make the process an economical one. Quite recently two Norwegians, Birkeland and Eyde, have worked out a method which gives promise of commercial success. A powerful solenoid is placed at right

*Sibley Journal of Engineering.

angles to the direction of the spark. The arc is deflected by the magnet and starts further and further back on the electrodes until finally it breaks and a new arc appears at the terminals. These changes occur so rapidly that to the eye there appears a continuous disc of flame. With 5000 volts and 500 kilowatts the disc of flame is over two yards in diameter. Through this disc air is blown and is converted partially into the oxides of nitrogen. The process is the most efficient that has yet been devised and is now on a semi-commercial basis. With a further increase in the price of nitric acid, the process should become commercially successful, unless some still better method is invented in the meantime.

The manufacture of graphite, carborundum, calcium carbide, calcium cyanamide and nitric acid has called for temperatures higher than any that can be obtained conveniently by non-electrical methods. We now come to a group of products which have long been manufactured by non-electrical methods.

The first of these is steel. As far as the ordinary grades of steel are concerned, the electric furnace will not be used for a long time to come. With high-grade tool steels and special alloys, the case is different. Crucible steel, so-called, is made in small units and the labor cost is high. An equally good grade of steel can be made in the electric furnace in much larger units and the consequent saving more than outweighs the extra cost of electrical heating. In fact, it is not too much to say that the crucible process is doomed. The Heroult furnace is a resistance furnace with two carbon electrodes dipping into the molten slag, beneath which is the fused steel. The Colby furnace (1890) and the Kjellin furnace (1900) are practically identical and are induction furnaces without electrodes. There is a high voltage primary and the metal to be melted is put in a ring-shaped crucible and constitutes the low voltage secondary. These furnaces were small ones at first, holding one ton of metal or at most three tons. Quite recently, however, a twenty-five-ton furnace of this type has been built. The actual data as to their performance are a bit meager, but it seems to take from 600-900 kilowatt hours to make a ton of steel, starting with cold iron.

The electric furnace has been used experimentally to make pig-iron from ores, but it can not compete with the blast furnace as far as any ores are concerned which the blast furnace can handle economically. On the other hand, owing to the higher temperature obtainable, the electric furnace may be able to give good results with ores rich in sulphur or titanium, ores which the blast furnace people can not or will not handle. The electric furnace is already a successful competitor of the blast furnace in the matter of ferro alloys.

Ferrosilicon is made in an arc furnace with an 85-volt arc striking between the walls of the crucible and four movable carbon electrodes, each twelve inches square. As the temperature at which silicon volatilizes is only a little above that at which the reaction takes place, it is impossible to heat the ferrosilicon up to a point at which it can be drawn off continuously. The process is therefore discontinuous, about 1200-1500 pounds of fifty per cent ferrosilicon being obtained at a single pour. This product competes with pure silicon made in the electric furnace and with blast furnace ferrosilicon containing perhaps fifteen per cent silicon. The chief use of ferrosilicon is in deoxidizing iron and it is usually added in the ladle. If a low grade ferrosilicon is used, so much has to be added that there is danger of chilling the melt. Pure silicon is unsatisfactory since it does not mix readily, owing to the difference in the density between it and the metal.

Ferrochrome is made in an arc furnace with the crucible as one electrode and four 8-inch graphite pencils as the other. The voltage used is 110. Since chromium is not volatile, ferrochrome can be heated to a temperature at which it flows freely. The process is therefore a continuous one, a single furnace running, perhaps, six months on a stretch. The product is a ferrochome containing seventy per cent chromium, and it can be sold at the same cost per unit of chromium as the blast furnace ferrochrome, which contains only fourteen per cent chromium. There is one rather interesting point about this ferrochrome. The chrome iron ore, from which it is made, is brought to this country all the way from New Caledonia. A part of the output is then shipped back across the continent again and sent over the Pacific to Japan to be used in making armor plate. The rest is sold in this country and in England for the same purpose.

With the manufacture of phosphorus a new factor comes in. The old method involved the treatment of phosphate rock with sulphuric acid and the subsequent reduction with coke. In this process the sulphuric acid was lost. By working at a higher temperature it is possible to substitute sand for sulphuric acid, and phosphorus is now made by heating phosphate rock, sand and coke in a resistance furnace. The extra cost of electric heating is met by the decrease in the cost of the raw materials.

In the manufacture of carbon bi-sulphide, the cost of electric heating is covered by the increased yield per day, owing to the greater reaction velocity at the higher temperature and by the advantage due to internal heating. Carbon and sulphur are heated together in a furnace forty-one feet high and sixteen feet in diameter. The current used is 4000 amperes at 40-60 volts. The yield is about ten thousand pounds of carbon bi-sulphide a day, and one furnace has been known to run for seventeen months before shutting down. Owing to the internal heating, it is possible to keep all joints tight and to avoid the extreme discomfort usually attendant on the manufacture of carbon bi-sulphide.

These instances serve to illustrate the points in which the electric furnace is superior to other forms of heating. It is not enough that a product can be made in an electric furnace. If the industry is to be on a sound basis, the manufacture by means of the electric furnace must be the cheapest method of production.

KORTING ELECTRIC TEMPERING FURNACE.

Messrs. Korting Bros., of Berlin, have constructed a new type of electric furnace for tempering steel. The metal is placed in a fused salt, which must have a high melting point, and not evaporate to a perceptible degree, even at a high temperature. With barium chloride one can thus maintain a temperature of 1,300 degrees Centigrade. The furnace is in form of a square box, made of asbestos iron and refractory bricks, inside which there is a square space forming the crucible, which is filled with salt. Two iron plates attached to opposite sides act as electrodes for the alternating current supplied by an oil transformer. When the salt is melted the metal object is lowered down, and temperature can be controlled with a pyrometer and rheostat. Differences of temperature are very slight at various points of the molten mass, varying, for example, from 1,108 degrees to 1,123 degrees Centigrade. With this device tools weighing more than 2,200 kilogrammes can be raised to a temperature of 850 degrees Centigrade in four minutes. It is well to heat these tools to bright red before putting them in the furnace. When the latter is kept at its maximum of 1,300 degrees Centigrade for ten hours there is no need to add more than one kilogramme of barium chloride, a substance which seems best for extreme temperatures. For lower ones a mixture of barium chloride and potassium chloride can be utilized. The furnace lining lasts a year. As for the crust of melted salt which adheres to the steel, it falls away of itself when the steel is dipped in cold water.

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EDITORIAL.

San Francisco's Reproach.

San Francisco's cup of bitterness is not yet full. This week another strike was added to the long list to discommode and vex the community. Last Saturday the operators of the Western Union and Postal Telegraph Companies, both in San Francisco and in Oakland, left their keys. Both companies in a measure were prepared for the strike, and have been able to give the public moderate service. The fundamental cause of this latest strike seems to have been the same old one—not so much a question of hours and wages as the determination of the operators to force the companies to recognize the Unions, and to employ none other than Union men. Both companies have accepted the challenge, and here again we are to witness a struggle of employer against employe on the vital principle of the "Open Shop."

Business, of course, has been discommoded seriously; but if reports in the daily press are to be believed, the troubles and vexations that threaten to overwhelm many business men in San Francisco are not yet complete. We are informed that the mail carriers are planning to strike on July 1. With the telephone service still handicapped, with uncertain telegraph wires, with long delayed freight, with disinclination on the part of the bankers to extend credit, and now with the prospect of interruption of mail service, surely the merchant or manufacturer in San Francisco needs the patience of Job and the sanguine temperament of a Joshua.

It is obvious that San Francisco was selected as the theatre of the telegraph operators' strike, because this city is considered the stronghold of Trade Unionism throughout the country, and that here the prospects seemed brightest for victory.

Some there may be—ardent and blind sympathizers with Trade Unionism, right or wrong—who would profess themselves well satisfied that San Francisco should have been so selected. Others—and we hope they are in the majority—will, as does "The Journal," deplore the fact that San Francisco has become notorious, the world over, as the City of Strikes, almost all of which are foolish and needless.

Obviously such a reputation constitutes a grave reproach—a reproach to the common sense of this community, a menace to peace and prosperity, and a distinct injury to the credit of its business men and the financing of its necessary enterprises.

Mr. James D. Phelan returned from a mission to the East last week, and reports that the credit of San Francisco has been severely shaken, not by the disasters of April, 1906, but by the perpetual strikes and dissensions that have since caused even more serious upheaval, and by the fact that abnormal conditions have prevailed, sending prices both of labor and living "sky high," and thereby perverting what once was, and should be, a most fruitful field for investment, into a locality shunned by conservative financiers. Mr. Phelan had the greatest difficulty in placing loans for $4,500,000, loans which under normal conditions could have been negotiated easily, since the securities were undeniable.

Nor is the reproach that San Francisco is a "City of Strikes" limited merely to our commercial prosperity and our financial credit. The finger of scorn from all parts of the earth is pointed at San Francisco because her municipal government is a farce—at present a double-headed hydra—and, moreover, because property is insecure and the safety of the citizen upon her streets is by no means assured.

We have witnessed this week Brigadier-General Funston's refusal to accept the invitation of the Fourth of July committee for the presence of Federal troops in the parade. General Funston was disinclined to run the risk of men wearing Uncle Sam's uniform

being sneered at and jeered at by an "as yet unwhipped mob." He was afraid that the "day we celebrate" might be marred by a breach of the peace precipitated by hoodlums insulting the troops or throwing bricks at them from the tops of buildings.

While we do not agree with General Funston's position, because we do not believe that in any American city American troops would fear anything, especially by their appearance in a Fourth of July parade, and while we fancy that a demonstration by the troops next week might have exercised a wholesome influence upon the lawless elements of this community, yet we must admit that the phrase used by General Funston is well founded and distinctly justifiable.

No man who has walked the streets, or ridden in the street cars, or even read the daily press of this city during the last two months, can deny that there is a large lawless and vengeful element in our midst today. Women have been insulted, innocent men assailed, property destroyed, and mobs have rioted on our streets. There is available on every hand plenty of evidence that there is an "as yet unwhipped mob" in San Francisco.

No citizen can read without shame the accounts of the violent outrage near the Chutes last Saturday evening, when a gang of eight men, three of whom were captured and identified as Union men, stormed a street car and violently assaulted its crew. No true San Franciscan can read without shame and alarm of the two riots by which the peace of the Sabbath was destroyed in the Mission last Sunday. These men should be punished as speedily as possible, and given the maximum sentence under the law. Then, if they should ever again try to mingle with the people of the city they should be drummed out of town—they do not belong in any city or town in America.

Sooner or later the mob must be whipped, or else the reproach of San Francisco will remain. The city has no confidence in its Chief of Police. There are many fine fellows and good citizens in San Francisco's police force, who are able and willing to do their duty, but the demoralization of the police as a whole is complete, due to the thieves and cut-throats who are still in nominal control of the administration of the city. As long as the mob exists the sacred liberty of the individual cannot be assured. The God-given right, guaranteed by the State and Federal constitutions for a man to exercise his own discretion under the law, how and for whom he will work, cannot be protected as long as the San Francisco mob remains unwhipped.

But no matter in what sense General Funston used the words "unwhipped mob," San Francisco will see to it that the proper persons are good and soundly whipped. San Francisco is now in a financial crisis. It will be far worse before it is any better. Honest and dishonest labor will suffer; merchants and bankers will feel the blows which are to come. Every one will seriously feel the effect of the absolutely necessary reconstruction of the city's affairs. And the mob will surely be whipped in more ways than one.

We do not hesitate to tell what seems to us the truth regarding San Francisco's serious situation, but sooner or later, in good and sufficient season, the hoodlum, the grafter, and the thug who brings discredit on all labor, will not only be whipped but will, we believe, be permanently banished from what will some day again be "THE GOOD CITY OF SAN FRANCISCO."

TRADE CATALOGUES.

Bulletin No. 57 from the Bristol Company, Waterbury, Conn., shows Bristol's A. C., D. C. Recording Voltmeter, Type 8, both switchboard and portable forms.

General Electric Company, Schenectady, N. Y., sends a number of well-illustrated bulletins describing various kinds of apparatus manufactured by them. They include the following subjects: Commutating Pole Railway Motors; Lightning Arresters, 1907 Types; Electrically-operated Rachet-Driven Rheostat Switches; Edison Miniature Incandescent Lights; Cast Grid Rheostats; C. Q. Generators and Balancer Sets; Thomson Single-phase High-torque Induction Wattmeter; G. E. Knife-blade Switches, and Parts of R. Controllers. A description of the electrification of the West Jersey and Seashore Railroad is of interest.

PERSONAL.

The local offices of the Electric Storage Battery Company, of Philadelphia, Pa., will be moved from 11 Hawthorne Street, to the Crocker Building, San Francisco, about July 1.

Clarence C. Wilson, M. E., has moved from 507 Market Street to 22 First Street, where he has opened offices as mechanical consulting engineer.

Mr. H. A. Kluegel, of Oroville, has accepted a position as chief engineer for the Truckee Lumber Company, with headquarters at Truckee.

OCEAN SHORE RAILWAY.

Tuesday afternoon a trial trip was made on the Ocean Shore Railway. A construction car, bearing the president of the Company, J. Downey Harvey; Sidney Sprout, engineer; W. G. Vincent, assistant engineer, and other officials and newspaper men, started from Twelfth and Howard Streets to make the run over the two and one-half miles of track. The electrical appliances of the car worked well, and the run from Twelfth and Howard Streets to Twelfth and Division was made smoothly. At Division Street the trolley pole broke and fell on the car and struck Engineer Sprout on the head, inflicting a severe lacerated wound of the scalp.

Starting at 4 o'clock Wednesday, the first complete run over the line was made. The route traveled was from Twelfth and Howard Streets to Division, to Florida, to Mariposa, to Potrero Avenue, to Twenty-fifth Street, to Vermont, to Army, to Kentucky. An inspection of the freight yards site, which extends parallel with Army Street from Vermont to Kentucky, was made. It is expected that the Ocean Shore Road will be in operation from Twelfth and Market Streets, the local terminal, to Point San Pedro, within a few months.

LOCAL STOCKS AND BONDS

Furnished by Courtesy San Francisco Stock and Bond Exchange.

Outstanding	INTEREST	MISCELLANEOUS BONDS.	JUNE 21		JUNE 22		JUNE 24		JUNE 25		JUNE 26		JUNE 27	
			Bid	Asked	Bid	Asked	Bid	Asked	Bid	Asked	Bid	Asked	Bid	Asked
1,532,000	F & A	Associated Oil Co. 5%	.....	81	.....	81	.....	81	.....	81	.....	81	.....	81
2,250,000	M & S	Bay Counties Power Co. 5%	.....	100	.....	100	.....	100	.....	99	.....	99	.....	99
1,000,000	F & A	Cal. Central Gas & El. 5%	.....	103	.....	103	.....	103	.....	103	.....	103	.....	103
9,600,000	M & S	Cal. Gas & El. Gen. M. & C. T. 5%	.....	80	77	79	77	79	77	80	77	80	.....	80
900,000	J & J	California St. Cable Co. 5%	100	103½	100	105	.....	105	.....	105	100	103	102	.....
2,000,000	J & J	Contra Costa Water Co. 5%	100	102½	100	102½	100	102½	101½	102½	101½	102½	101½	102½
1,000,000	J & J	do do Gen. Mtg. 5%	.....	97½	.....	97½	.....	97½	.....	98	.....	98	.....	98
623,000	F M A N	Edison Light & Power 6%	.....	115	.....	115	.....	115	.....	115	.....	115	.....	115
650,000	M & S	Ferries & Cliff Ho. Ry. 6%	103	.....	103	.....	103	.....	103	.....	103	.....	103	.....
671,000	A & O	Geary St. Ry. 5%	52	.....	52	.....	52	.....	52	.....	52	.....	52	.....
610,000	M & N	Honolulu R. T. & L. Co. 6%	105⅜	.....	105¼	.....	105½	.....	105¼	.....	105¼	.....	105¼	.....
300,000	A & O	Lake Tahoe Ry. & T. Co. 5%	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
500,000	J & J	Los Angeles Elec. Co. 5%	100	.....	100	.....	100	.....	100	.....	100	.....	100	.....
1,300,000	J & J	Los Angeles Gas & Elec. Co. 5%	.....	101½	.....	101½	.....	101½	.....	101½	.....	101½	.....	101½
5,000,000	A & O	Los Angeles Ry. 5%	106	108	106	.....	106	.....	106	107½	106	107¼	106	107
1,000,000	A & O	Los Angeles Lighting Gd. 5%	.....	105	.....	105	.....	105	.....	105	.....	105	.....	105
1,500,000	A & O	Los Angeles Pac. R. R., 1st Con. Mtg. 5%	102½	103½	102	103½	102	103½	102	103½	102	103½	102	103½
3,030,000	M & S	L. A. Pac. R. R. of Cal. 5%	.....	102½	.....	102½	.....	102½	.....	102½	.....	102½	.....	102½
3,000,000	J & J	Market Street Cable 6%	107	.....	107	.....	107	.....	107	.....	107	.....	107	.....
5,141,000	M & S	do Ry., 1st Cons. Mtg. 5%	.....	103	.....	103	.....	103	100	104	100	.....	100	103
100,000	A & O	Mill Valley & Mt. Tamalpais S.Ry. 5%	103	.....	103	.....	103	.....	103	.....	103	.....	103	.....
4,751,000	A & O	Northern Ry. Co. of (Cal.) 5%	111	112	.....	112	.....	112	.....	111¼	.....	111¼	110½	.....
1,498,000	J & J	North Pacific Coast R. R. 5%	100¾	.....	100¾	.....	100¾	.....	100	.....	100	.....	100	.....
1,074,000	J & D	Northern Cal. Railway 5%	.....	105	.....	105	.....	105	.....	105	.....	105	.....	105
980,000	J & D	Northern Cal. Power Co. 5%	.....	100	.....	100	.....	100	.....	99	.....	99	.....	100
6,000,000	A & O	Northern Electric Co. 5%	.....	97½	.....	97½	.....	97½	.....	97½	.....	97½	.....	97½
1,000,000	M & S	Oakland Gas Light and H. 5%	102	107	102	106	102	107	.....	105	.....	105	.....	105
1,374,000	J & J	Oakland Transit Co. 6%	111	.....	111	.....	111	.....	111	.....	111¼	.....	111¼	.....
1,600,000	J & J	Oakland Transit 5%	103	.....	102½	.....	102½	.....	.....	104	.....	104	.....	104
1,326,000	J & J	Oakland Transit Con. 5%	101½	102½	101¾	103	101	.....	.....	.....	.....	.....	.....	.....
7,000,000	J & J	Oakland Traction Con. 5%	.....	101½	.....	101½	.....	100	.....	99	.....	99	.....	99
1,500,000	J & J	Oakland Water Co. gtd. 5%	.....	97½	.....	97½	.....	97½	.....	97½	.....	97½	.....	97½
2,000,000	A & O	Omnibus Cable Ry. 6%	112	118	112	118	.....	118	.....	114	.....	114	110	116
1,149,000	S D M J	Pacific Gas Imp. 4%	.....	95	.....	95	.....	95	.....	92½	.....	92½	.....	92½
8,494,000	J & J	Pacific Electric Ry. Co. 5%	101¾	102¼	101¾	102⅛	102	102¼	102	102¼	102¼	.....	102¼	102½
4,491,000	J & J	Pacific Light & Power Co. 5%	.....	100	.....	100	.....	100	.....	100	.....	100	.....	100
3,000,000	J & J	Pacific Tel. & Tel. Co. 5%	.....	104	.....	104	.....	104	.....	104	.....	104	.....	104
350,000	J & J	Park & Cliff House Ry. 6%	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
250,000	J & J	Park & Ocean R. R. 6%	.....	112½	.....	112½	.....	112½	.....	112½	.....	112½	.....	112½
700,000	M & S	Powell Street Railway 6%	.....	107½	.....	107½	.....	107½	.....	107½	.....	107½	.....	107½
2,500,000	M & N	Sacramento Elec. Gas & Ry. 5%	.....	100	98	99	98	99	98	99	98	99	.....	100
6,000,000	A & O	S. F. & S. J. Valley Ry. 5%	111	.....	111	.....	111	.....	.....	112	111	.....	111	.....
3,000,000	J & J	S. F., Oak. & San Jose Ry. 5%	103½	.....	103½	.....	103½	.....	103½	.....	104	.....	104	.....
1,500,000	J & J	do do 2d Mtg. 5%	.....	101	.....	101	.....	101	.....	101	.....	101	.....	101
1,500,000	A & O	S. J. & S. Clara Co. R. R. 4½%	.....	91	.....	91	.....	91	.....	91	.....	91	.....	91
642,000	A & O	Sierra Ry. of Cal. 6%	108½	.....	108½	.....	108½	.....	.....	108	.....	107	.....	106
6,000,000	J & J	S. P. R. R. of Arizona 6% (1909)	103½	.....	103½	.....	103½	.....	103½	.....	103½	.....	103½	.....
4,000,000	J & J	do do do (1910)	104	.....	104	.....	104	.....	104	.....	104	.....	104	.....
5,116,000	A & O	S. P. R. R. of Cal. 6% (1912)	.....	110	.....	110	.....	110	.....	110	.....	110	.....	110
4,127,500	M & N	S. P. R. R. of Cal., 1st c. gtd. 5%	113⅝	116⅞	113⅝	116⅞	113⅝	116⅞	113⅝	116⅞	113⅝	116⅞	113⅝	116⅞
3,533,000	A & O	S. P. Branch Ry. of Cal., 6%	123¾	.....	124	.....	125	128	124¾	.....	124¾	.....	124¾	.....
81,178,000	J & J	S. P. R. R. Co., 1st Ref'd'g. 4%	90	91	90	91	90⅝	.....	90½	91	90½	91	90½	91
17,500,000	J & D	Spring Valley Water Co. Gen. Mtg. 4%	.....	85½	.....	85	.....	86	.....	86	84½	85	84½	85
300,000	M & S	Stockton Gas & Elec. Co. 6%	100	.....	100	.....	100	.....	100	.....	100	.....	100	.....
2,000,000	J & J	United Gas & Elec. Co. 5%	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
20,000,000	A & O	United R. R. of S. F. 4%	69	.....	68⅝	.....	68¾	69½	69	69½	69	69½	69	69½
2,500,000	M & N	Valleys Counties Power Co. 5%	.....	100	.....	100	.....	100	.....	100	.....	100	.....	100
		Water Stocks.												
.....	.....	Contra Costa	.....	62	.....	62	.....	62	.....	62	.....	62	.....	62
6,000	Quarterly	Marin County	.....	62	.....	62	.....	62	.....	62	.....	62	.....	62
280,000	.....	Spring Valley Water Co.	19⅞	20¼	19¾	20	.....	20	19¾	20	19¾	20	19¾	.....
		Gas and Electric Stocks.												
37,500	.....	Martel Power Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
9,340	.....	Mutual Electric Light Co. (Ctfs.)	4½	.....	4½	.....	4½	.....	4½	.....	4½	4¾	4½	.....
37,336	.....	do (Extended Ctfs.)	12½	13	12½	13	12½	13	12½	13	12⅝	.....	12⅝	.....
40,000	Monthly	Pacific Lighting Co.	60	75	60	.....	.....	70	.....	70	57½	70	55	70
12,000	.....	Stockton Gas & Elec. Co.	52	.....	52	.....	52	.....	52	.....	52	.....	52	.....
		Street Railroad Stocks.												
10,000	.....	California	.....	135	.....	135	.....	135	.....	135	.....	135	.....	135
10,000	.....	Geary	.....	41	.....	41	.....	41	.....	41	.....	41	.....	41
10,000	.....	Presidio	.....	25	.....	25	.....	25	.....	25	.....	25	.....	25
	Semi-an.	Associated Oil Co.	33½	33¾	.....	34	33	33¾	32	33	31⅝	.....	32¼	.....
1,625	Quarterly	Mill Valley & Mt. Tamalpais S. Ry.	.....	110	.....	110	.....	110	.....	110	.....	110	.....	110
180,000	Quarterly	Pac. Tel. & Tel. Co. (Pfd.)	.....	95	.....	95	.....	95	.....	100	.....	100	.....	100
180,000	.....	Pac. Tel. & Tel. Co. (Common)	7½	15	7½	15	7½	15	7½	15	7½	15	7½	15

Unlisted Securities

750,000	A & O	Bay Counties Power Co. 6%	.....	103	.....	103	.....	103	.....	103	.....	103	.....	103
745,000	M & S	Blue Lakes Water Co. 6%	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2,000,000	A & O	California Northwestern Ry. 5%	.....	108	.....	108	.....	108	.....	108	.....	108	.....	108
160,000	J A J O	Marin County Water 5%	.....	100	.....	100	.....	100	.....	100	.....	100	.....	100
600,000	J & J	Risdon Iron Works 5%	.....	100	.....	100	.....	100	.....	100	.....	100	.....	100
500,000	M & S	S. F. Dry Dock 5%	.....	109	.....	109	.....	109	.....	109	.....	109	.....	109
8,000,000	M & N	S. F. Gas & Electric 4½%	.....	95	.....	95	.....	95	.....	95	.....	95	.....	95
3,926,000	J & J	S. F. & North Pacific Ry. 5%	103	.....	103	.....	103	.....	103	.....	102¾	.....	103	.....
5,500,000	J & J	South Pacific Coast Ry. 4%	.....	95	.....	95	.....	95	.....	95	.....	95	.....	95
.....	.....	Standard Electric Co. 5%	.....	92½	.....	92½	.....	92½	.....	92½	.....	92½	.....	92½
.....	.....	do do Gtd. 5%	.....	95	.....	95	.....	95	80	85	80	86	80	86
750,000	J & J	Sunset Tel. & Tel. Co. 6%	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2,250,000	A & O	Sunset Tel. & Tel. Co. 5%	.....	105¼	.....	105¼	.....	105¼	.....	105¼	.....	105¼	.....	105¼
1,000,000	M & N	Sutter Street Railway 5%	.....	105	.....	105	.....	105	.....	105	.....	105	.....	105
		Stocks.												
50,000	Monthly	Gas Consumers' Association	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
100,000	Monthly	Northern Cal. Power Co.	20¾	21½	20¾	21½	20¾	21½	20¾	21½	21	.....	21	.....
.....	.....	Pac. Gas & Elec. (Pfd.)	.....	50	.....	50	.....	50	.....	50	.....	50	.....	50
.....	.....	Santa Cruz Port. Cement	.....	55	50	51½	50	.....	.....	55	.....	55	.....	50
.....	.....	Standard Port. Cement (New)	.....	65	.....	65	.....	65	.....	65	.....	65	.....	65
50,000	Monthly	Truckee Electric Co.	15	16	15	16	15	.....	15	16	15	16	14¾	15½

Electrical Construction for the Architect and Engineer

Inspection of Old Wiring.

"The reduction of fire hazards by inspection of new wiring installations is approved practice in all progressive cities, and no arguments are needed to demonstrate the foresight of such work," says the "Western Electrician." "The reliable wiring contractor and the electrician who understands his business have nothing to fear from intelligent inspection by insurance and municipal authorities. The activity of inspectors with reference to new installations, seldom applies in the examination of old wiring, however, for the reason that municipalities are inclined to limit the appropriations for city electrical departments to sums inadequate to provide for the regular examination of either old installations or outside work in addition to the maintenance of fire-alarm and police-telegraph systems, routine office work and the inspection of new wiring layouts.

"A study of the causes of fires as given in the annual reports of chief engineers of fire departments in various cities shows that an exceedingly small percentage of the alarms arise from electrical troubles, but it is none the less important that high standards of wiring shall be insisted upon, because the electrical industry as a whole suffers an injury whenever fires are credited to it, regardless of the justice of the claims, and, of course, because losses can only be reduced by attention to every possible conflagration cause. There is a vital need of inspection of old wiring, for the deterioration of existing installations and the improper connection of apparatus to systems by unauthorized or inexperienced consumers pave the way toward even more serious results than are ordinarily to be expected in the case of new work carelessly installed.

"An illustration of the evils of irresponsible wiring occurred recently in an ice-cream factory operated by electric motors. The original installation was a two-horsepower, 550-volt, direct-current motor, duly inspected and approved, a certificate of operation being given to the local lighting company by the city. A few months later a second motor was installed and connected to the mains. No notice for inspection was sent; neither the city nor the electric-light company had knowledge of the installation of the second motor, and so no inspection was made. The motor was mounted on a revolving iron post and was improperly installed, the floor all around the motor being constantly covered with water. Repeated movements of the revolving post caused the breakage of one of the motor leads, the broken end of the wire coming in contact with the casing of the motor and grounding the current through the wet floor, iron post and motor casing. A workman who investigated the cause of stoppage was killed by the shock, and another employee was seriously injured. The inspection of the installation by the proper authorities and the execution of construction work by qualified employees or contractors in such cases would do much to improve the conditions.

"H. S. K."

APPROVED ELECTRICAL DEVICES.

This department from time to time will contain an illustrated description of all fittings approved by the Underwriters' National Electric Association.

FLEXIBLE CORD, PORTABLE.

For Electric Heaters. Double conductor cord, twisted or flat, composed of stranded, braided conductors, with rubber and asbestos coverings protected by woven cotton braids. Fireproof or weatherproof saturation of outer braids. Approved May 20, 1907. Manufactured by

John A. Roebling's Sons Co., Trenton, N. J.

CABINETS.

"Krantz" panelboard cabinets of wood, metal-lined, or of steel with or without lined gutters. Approved June 8, 1907. Manufactured by

H. Krantz Manufacturing Co., Brooklyn, N. Y.

CONDUIT BOXES.

"Wirelets." For exposed conduit work. All procelain cover types. Approved June 8, 1907. Manufactured by

Appleton Electric Company, Chicago, Ill.

RECEPTACLES, MINIATURE.

G. E. Candelabra, Cat. No. 9446, cleat type, porcelain base, ½-A. 125-V. Approved June 8, 1907. Manufactured by

The General Electric Co., Schenectady, N. Y.

RECEPTACLES, STANDARD.

Chase-Shawmut stage pocket and plug, 50-A, 125-V. Attachment plug for stage cable. An iron floor box in which is mounted a slate base carrying receptacle for special plug. Approved June 8, 1907. Manufactured by

Chase-Shawmut Company, Newburyport, Mass.

G. E. weatherproof rosette receptacle, cleat type. Cat. No. 40,499. Approved for outdoor use only June 8, 1907. Manufactured by

General Electric Co., Schenectady, N. Y.

ROSETTES, ENCLOSED FUSE.

"Thomas" 2-A., 250-V., for use with glass tube enclosed fuse. Cleat type, Cat. No. 3423; concealed type, No. 3424; and moulding type, No. 3425. Approved June 8, 1907. Manufactured by

Perkins Electric Switch Manufacturing Co., Bridgeport, Conn.

ROSETTES, FUSELESS.

Bryant "K. P." cleat, concealed and moulding types. Cat. Nos. 1499, 1710 and 1497. "Junior" cleat types, Nos. 1999 and 297, concealed No. 298 and moulding, No. 299. Approved June 8, 1907. Manufactured by

The Bryant Electric Co., Bridgeport, Conn.

"Knowles" cleat and concealed types, and small cleat type, 3-A, 200-V. Approved June 8, 1907. Manufactured by

C. S. Knowles, Boston, Mass.

P. & S. 3-A, 250-V. Cleat type, Cat. Nos. 602, 603, 607, 703, and 06, with porcelain sub-base, concealed type, No. 604, and ceiling buttons 70 and 170. Approved June 8, 1907. Manufactured by

Pass & Seymour, Solway, N. Y.

SWITCHES, COMBINATION CUT-OUT.

"Paiste." Porcelain base plug cut-outs, with base recessed for D. P. surface snap switches. 10-A, 125 or 250-V. Cat. Nos. 5190, 5193, inclusive. Approved June 8, 1907. Manufactured by

H. T. Paiste & Co., Philadelphia, Pa.

SWITCHES, PUSH-BUTTON FLASH.

"Knowles" single and double-pole and 3-way, 3-A., 250-V., 6-A., 125-V. Approved June 8, 1907. Manufactured by

C. S. Knowles, Boston, Mass.

Perkins S. P. 3-point, 4-point. Cat. Nos. 2201, 2203, 2204, and lock types, 2295, 2296, and 2297. D. P. 10-A., 250-V., Cat. No. 2202, and lock type 2298. Approved June 8, 1907. Manufactured by

Perkins Electric Switch Manufacturing Co., Bridgeport, Conn.

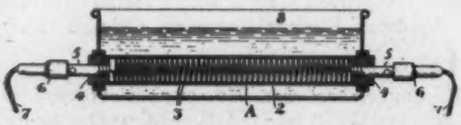
PATENTS.

Electric, Gas and Water.

Specially reported for the Journal of Electricity, Power and Gas.

ELECTRICAL HEATER AND EXPANSION COIL.

No. 856,736. An electrical heater consisting of an exterior tube, an elastic insulating sheet expanded to fit closely within the tube, an electrical resistant coil expanded to fit the interior of the insulating sheet and retain it in close

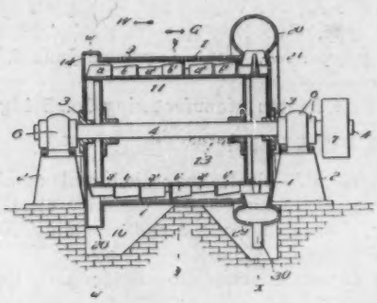


contact with the tube, and connections whereby an electrical current may be passed through the coil, connections including non-conducting bushings fixed in the end of the tube, and plugs fixed in the bushings and connecting with the coil.

Milton H. Shoenberg, San Francisco, Cal., Assignor to Consolidated Electric Appliance Companies.

GAS-WASHER.

No. 856,731. In a gas washer, the combination with a suitable casing having a gas outlet at its rear end, a water inlet adjacent to its rear end, a gas inlet and water outlet in the lower portion of its circumference at its front end, of a water seal arranged below water outlet and forming

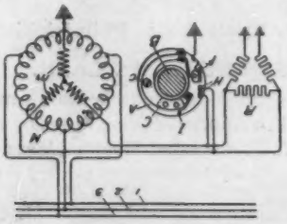


the bottom thereof to receive the water and impurities from the washer, a suitable drum, inclined wings on the drum arranged to force the water centrifugally and forwardly, means to rotate the drum, and means to force the gas through the casing around the drum from front to rear.

Gustav Saaler, New York.

CENTRIFUGAL SWITCH FOR ELECTRIC MOTORS.

No. 856,433. In a motor, a centrifugally-actuated switch carried by the motor armature comprising a centrifugally-movable member, a switch contact operated by member, a

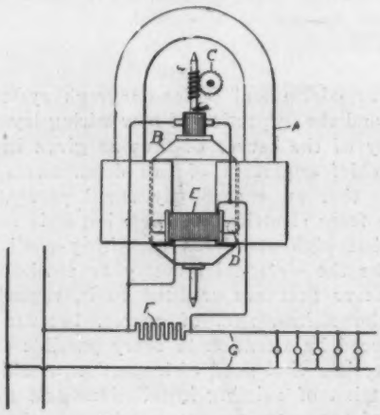


connection between contact and member adapted to move contact in a substantially circumferential direction when member is moved centrifugally and to permit a centrifugal movement of contact relative to member, a slide adapted to be traversed by contact when moved circumferentially and to restrain it against centrifugal force, and a switch contact connected to the armature winding of the motor and forming a portion of slide.

Knut Tornberg, Lynn, Mass., Assignor to General Electric Company.

ELECTRIC METER.

No. 856,412. An electric meter comprising a field of substantially constant strength on full load, a rotatable armature, connections for supplying to armature a voltage

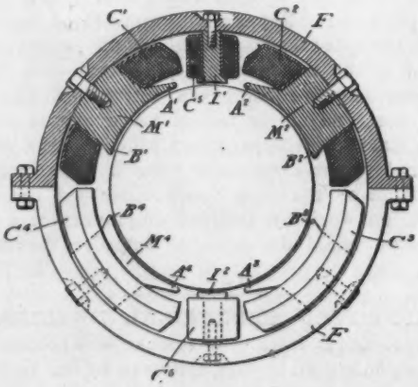


proportional to the load-current, a registering train driven by armature, and means for producing a decrease in the strength of field on light load.

Arthur J. Martin, Rugby, England, Assignor to General Electric Company.

ALTERNATING CURRENT MOTOR.

No. 856,477. In an alternating current motor, the combination with a primary member having a winding adapted to produce a plurality of numbers of magnetic poles and means for changing from one number to another, of a sec-



ondary member having a plurality of windings of different resistance that are respectively effective for different numbers of poles in the primary member.

Benjamin G. Lamme, Pittsburg, Pa., Assignor to Westinghouse Electric & Manufacturing Company.

INDUSTRIAL

ELECTRIC LABOR-SAVING DEVICES IN THE HOUSEHOLD.

It is not only possible for the resident of a large city or town to have the advantages of electric labor-saving devices in the home, but it is also possible, by means of the great improvements in gasoline engines, and the introduction of alcohol as a fuel for internal-combustion engines, to provide electric current in the country home, for lighting and other service to which it is so well adapted.

It is now generally acknowledged that the modern home is not complete unless it is wired throughout for electric current, for there are no labor-saving devices of greater importance at the present time than those now available for operation by electricity in the home.

ELECTRIC BREAKFAST-COOKING SET

A newly-constructed house can hardly be said to be up-to-date which is not wired for electric light, with convenient receptacles for heating devices, electric cooking apparatus, fan motors and other motors to be used on the electric lighting circuit.

The electric light vitiates the atmosphere less than any other form of light, and produces very little heat to make the reading room and lounging room of the country home or city residence disagreeable during the hot summer months.

The electric ventilation by fan motors is most perfect, and the conveniences which electricity affords are many and various. An up-to-date electrically-operated house near Schenectady includes the electric cigar lighter and electric radiator for use on chilly evenings. The electric equipment of the dining room includes electric chafing dish and coffee percolator, electric water boiler with cereal cooker and vegetable steamer attached. There are also to be found the electric frying pan and other standard cooking and baking outfits. The electric breakfast set is unique in construction, and the general electric cooking and baking table is equipped with electric broilers and other devices, including a five-combination electric cooking apparatus. In the laundry are electric flat-irons, electric wash boilers, and immersion heaters, which lighten the labors of the servants.

The electric dish-washing machine and the electric meat and vegetable chopper, as well as the potato-peeling machine shown in the accompanying illustration, indicate some of the modern conveniences now available for the home provided with cheap electric current. In the kitchen an electric fan not only keeps the room free from smoke and disagreeable odors, but also is utilized for drying pots and kettles, while the electric oven, pancake griddle and broilers make the duties of the cook less difficult to perform, while the electric chafing dish and teapot in the dining room or sitting room make the entertainment and refreshment of the caller a most pleasant duty for the housewife.

The kitchen and pantry of the large country home which is provided with cheap electric current can utilize to advantage the electric knife sharpener, the electric coffee grinder, and electric vegetable cutter for slicing beets, turnips and cabbages, while in the bath room electric water heaters may be utilized, as well as the massage motor and the electric shaving cup.

In the sewing room a small electric motor operates the sewing machine, and an electric sad-iron is provided for pressing the finished garments.

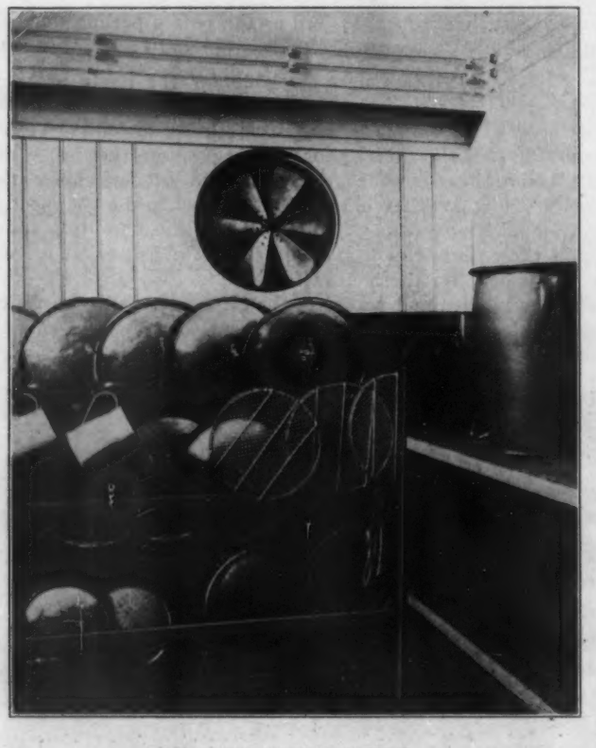
In the bed-chamber electric outlets are provided for the electric curling iron and the baby milk warmer, while throughout the entire home electric lights are well arranged, and electric heating devices, including electric radiators of the luminous type, may be employed for Winter and Fall use, and the electric fan for keeping the rooms cool in Summer.

A unique French system has been developed for heating, known as the electric thermophile in which Oriental Gobelin, Moquette carpets and rugs have electric heating wires woven in them, the same method of weaving insulated wires in electrically-heated coverlets and quilts being devised.

It is well known that electricity, the transmitting agent of power and light, is also an excellent producer of heat. By causing a certain density of current to pass through a conductor of determined resistance, the energy contained in the electric current can be almost completely transformed into heat. It will be noted that this action is of immediate effect from the beginning to the end and produces no smoke; con-

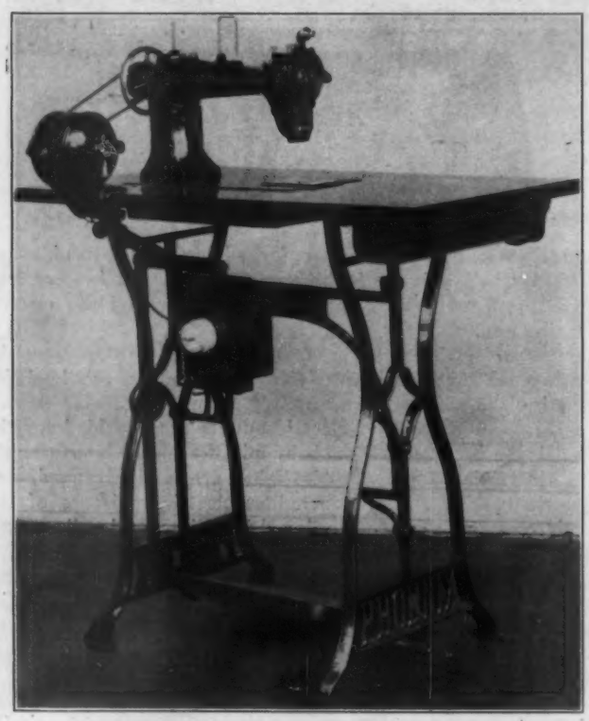
sequently there are no gaseous products.

It will be noted that the heating furnished by the electric thermophile realizes a considerable progress over all systems of heating heretofore used. Such heating can be obtained



FAN FOR DRYING DISHES

wherever the electric current is already used for lighting and that by means of carpets, coverings, coverlets and lace fabrics



SEWING MACHINE RUN BY MOTOR

which by their suppleness, elegance and comfort are adapted to all the exigencies of the most luxurious modern residence.

In the house it is the least cumbersome, as a supple wire, an electric coupling with suitable switches and fusible plug are sufficient to convey with security, the current to the thermophile.

In the bedroom it is the cleanest method of heating; in fact, it creates neither dust nor odor and requires neither reservoir nor fuel. The carpet which is a necessary element in the most simple furnishings and harmonizes with the business office as also with the elegance of the most luxurious saloon.

In the dining room or parlor it is least dangerous; it presents no danger of fire or of accident when the fitting, which is very simple, is undertaken by a competent person, it cannot give a greater heat than that for which it has been arranged, provided that when in use it is completely spread out in the free air, and is working at the tension arranged.

As to the cost of operation it is most economic if it is duly considered that it affords the best heat over large surfaces, and that it instantaneously transforms into heat all the electricity it receives, as soon as it is placed in circuit.

PRIZES FOR AN ELECTRICAL SOLICITOR'S HANDBOOK.

The following extract from a paper by Mr. R. S. Hale, of Boston, on "The Value and Use of a Solicitor's Handbook," will be of interest to those who are already competing for the prizes, as well as to others who may now contemplate to do so.

The paper above referred to was presented on the Commercial Program of the National Electric Light Association at Washington, on June 7th, 1907.

> "I want now to make a brief announcement of a change in plans in connection with the prize contest for the best electrical solicitor's handbook. The Co-operative Electrical Development Association wrote to all of those who had manifested an interest in the proposed contest last April to find out how they felt about an extension of time in which to submit the competing books.
>
> "By general agreement the time was set for October 1st, next, and all of the competitors must have their work turned in to the Co-operative Electrical Development Association, Cleveland, Ohio, by that time.
>
> "I am sure you all appreciate the value of this contest to central stations and others, because of the stimulating of interest everywhere and a fixing of the minds of a great many agents upon the details of their own handbooks through a desire to think up some way by which they could get into this contest.
>
> "I hold in my hands a New York draft for $2,600.00 which represents the total amount to be awarded in prizes to the successful competitors in this handbook contest. The money will be placed in a bank, where it will draw interest until the time the awards are made in October, so that the winners will not only get their prize money, but interest on it as well."

Those interested in this subject will be furnished promptly a pamphlet giving full details and particulars, upon application to the Co-operative Electrical Development Association, Cleveland, Ohio.

NEWS NOTES

TRANSPORTATION.

San Francisco, Cal.—President J. Downey Harvey, of the Ocean Shore Railroad, has appointed E. T. Charlton traffic manager for the company. Rapid progress is being made in the section of the new electric line in this city, and on the section between San Francisco and Half Moon Bay. When completed to Santa Cruz the road will be eighty-eight miles in length. A branch line to Watsonville is also planned. At Watsonville the proposed San Joaquin Western line is connected with it.

Fresno, Cal.—W. G. Kerchoff, who represents the Huntington Electric interests through the State, and is himself heavily interested in several schemes, declares that the money stringency occasioned by this attitude of the President is hindering the financing of the Yosemite road. The surveys have all been completed, and Engineer Newman expects to have the plans and estimates ready in a very little while, but the financing, says Kerchoff, has been interfered with by the conditions of finances stirred up by Roosevelt. No new lines, except those already announced, will be built in the near future.

Sacramento, Cal.—That the Northern Electric is a railway in the general sense of the term, and not an intercounty street car system, is in effect the decision of the State Board of Equalization, which, on the advice of the Attorney-General, concluded that the assessment of the tracks and rolling stock of the new electric line comes within the State jurisdiction. That part of the assessment work which the ruling of the Supreme Court does not allot to the State Board, such as assessment of sidings, depots, etc., will be made by the several County Assessors through which the lines of the company run. A like decision was made regarding the Vallejo, Benicia and Napa Electric.

Lodi, Cal.—Samuel B. McLenegan, formerly of the Huntington system in Los Angeles, but who resigned to become General Manager of the Central California Traction Company, declares that the company would be held back for some time from running their cars to this city by the failure of the insulators for the third rail to arrive. All other necessary material is on hand. The road from Stockton to Lodi will only be the beginning of a big system which will be built up by the traction company if given the proper support. The wires for the new company's line have been strung through this city, and only awaited the track being built from Stockton to be connected with what was already laid here. It was hoped that the line would be in operation by July 1st, but, owing to the failure of the insulators to arrive, the opening of the system has been unavoidably postponed.

Sacramento, Cal.—At their last meeting the Judiciary Committee of the Board of the City Trustees had a session with a representative of the Northern Electrical and the Vallejo Northern Railroads, at which the project of granting these roads franchises through the city, were thorougly discussed. The Northern Electric people desire a freight franchise from Eighteenth and C to Thirty-first, to R, to Second to M, to the river. The Vallejo road desires to obtain entrance through the city at a point near the foot of P Street, and the representatives of both roads were deadly in earnest in their demands. They pointed out that as far as they were concerned they had nothing to do with a bridge over the river, but they felt that they had no right to grant even an approach to the river until the representative of the United States Government had decided where such a structure should be located.

San Francisco, Cal.—President Stetson says: "We are going to establish open shop on the California Street line. We have had some men in our employ for a long time, and we would prefer to have them run the cars for us again; but we deal with them individually only. If they are not willing to come back on that basis we will have to fill their places. We cannot afford to pay more than the old rate, which was established by arbitration at 30, 31 and 32 cents. We should have started the line sooner if it had not been necessary to do certain repair work, but as soon as this is completed we will begin immediately. We will have nothing further to do with the Carmen's Union. The men individually are good men, and we should prefer to have them in our employ again; but we will not deal with them as an organization. I want that to be made perfectly plain. Some of our men have promised to return, and, as a matter of fact, most of them would like to go to work again. We will have no trouble in getting all the men we need."

ENGINERING.

Montesano, Wash.—United States Government Engineers have begun the survey of the Chehalis River from this place to Aberdeen, in accordance with an act passed by the last session of Congress.

Riverside, Wash.—During the past week three irrigation pumping plants have been installed along the Okanogan River, one for J. Foss Sargent, near Tonasket; one for James Carpenter, at Riverside, and one for McPherson Bros., at Brewster. This week there will also be one put in for C. S. Lee, at Omak.

Portland, Ore.—Colonel S. W. Roessler, in charge of the local office of the United States Engineers, opened bids for the delivery of rock at the Columbia River jetty, and recommended the awarding of contracts to the Columbia Contract Company. The bids were for two deliveries, one of 200,000 tons of small rock and one for a million tons of larger material. The former was for $1.10 and the latter for $1.12. Specifications call for delivery at the dock at Fort Stevens. Besides the bids submitted by the Columbia Contract Company, only one other was received. It was from the Puget Sound Bridge and Dredging Company, at $1.30 per ton for both classes of waterial.

ELECTRIC RAILWAYS.

Seattle, Wash.— Wightman & Muckler, to whom was granted a franchise for the Shore Line Electric Railway Company, have complied with all requirements of the Council, and work on the big project will begin on or before July 1.

Vancouver, Wash.—The Washington Railway & Power Company has been granted a franchise to build and operate a street railway system in Vancouver. One mile of track is down. In two months it is expected that the system will be in running order.

Colfax, Wash.—The Pullman, LaCrosse & Columbia River Railroad, a proposed electric line from Pullman to the Columbia River, which is being promoted by J. O. Staats, Dr. H. M. Greene and E. S. Knowlton, of La Crosse, is the latest railroad project in Whitman County.

Montesano, Wash.—The Grays Harbor & Puget Sound Railway announces that it has been decided to follow the original survey approved by Chief Engineer Clapp, and to build the main line up the south bank of the Chehalis River, crossing at Montesano, and then go east to Elma and the Sound.

New Westminster, B. C.—The latest application comes from the new electric railway company known as the Burrard, Westminster & Boundary Railway & Navigation Company. This company plans to build to Seattle from this city. The solicitor appearing on behalf of the company is Sir Charles Hibbert Tupper.

George W. Gregory, a Seattle attorney, who recently appeared before the Council asking for a franchise for an electric railway here, as well as for electric light and water franchises, was present at the meeting and announced to the Council that if it considered Weeks' proposition was preferable to his they should accept it.

Chehalis, Wash.—B. J. Weeks, of Tacoma, has asked the City Council of Chehalis for a 50-year franchise for the Centralia-Chehalis Electric Railway & Power Company. It is proposed to build an interurban electric line between Chehalis and Centralia. Weeks gives the assurance that actual construction will begin within sixty days, and that he now has a mile of steel which is available for this line, with six miles more that he can divert here.

LIGHT AND POWER.

Snohomish, Wash. — The Council ordered a new 10-inch wooden water main to be laid immediately, at a cost of $630. A 10-year contract with the Snohomish Electric Light & Power Company to furnish power for the pumping station at two and one-half cents per kilowatt hour, a minimum charge per month of $100, was approved and entered into. This will go into effect as soon as the new 6-inch auxiliary pump arrives. It is estimated this will save the city close to $100 per month.

TELEPHONES.

Kalama, Wash.—The Home Tel. Co. of Woodland has completed its line to Looney's Camp, and is putting in wire to Spelei.

New Westminster, B. C.—The Burnaby & Coquitlam Tel. Co. has been granted permission to enter the city to make connection with the city sustem.

Ellensburg, Wash.—The Park Tel. Co. has petitioned the County Commissioners of Kittitas County for a franchise for a telephone line along certain county roads.

New Westminster, B. C.—The Farmers' Tel. Co. will be ready to do business in Delta in about a month. The central office of the company will be located at Ladner.

Everett, Wash.—The Farmers' Mutual Tel. Co. has executed a mortgage in favor of the Title Trust Co. for $1,000,000, the funds so obtained to be used for extensions and improvements.

Colton, Wash.—A new rural telephone company, to be known as the Johnson-Chambers Tel. Co., has been organized at Johnson. President, C. S. Crocker; secretary and treasurer, James C. Langley.

Tacoma, Wash.—The Tacoma Tug & Barge Company is contemplating the equipment of the tug "Fearless" with a wireless telegraph outfit and erecting a station on top of the Pacific Cold Storage Company's building, in which the company has offices.

Seattle, Wash.—The Seattle-Alaska Wireless Telegraph Company has been incorporated by J. E. Chilburg, David Lynch, Jesse A. Frye and Daniel Landon, of Seattle, and Ormsby McHarg, of Jamestown, N. D. Capital, $400,000, for the purpose of installing a wireless telegraph system between Seattle and Nome.

TRANSMISSION.

Pass & Seymour, Inc., of Solway, New York, has taken over the business of the Sarco Company, 906 Sixth Avenue, New York, and will manufacture their electrical specialties, consisting of attachment plugs, pendant switches, key-arm switches, push-buttons, etc.

The Cutler-Hammer Manufacturing Company, of Milwaukee, makers of electric motor controlling devices, has purchased The Wirt Electric Company, and will continue the manufacture of Wirt apparatus. Pending the incorporation in the Cutler-Hammer catalogue of apparatus of the Wirt type, the current Wirt catalogue should be used. Attention is called to the complete line of battery-charging rheostats developed by The Wirt Company, and to the Wirt field rheostats, which in 1902 were awarded the John Scott medal, on recommendation of the Franklin Institute of Pennsylvania. Bulletins covering these and other lines of Wirt apparatus will be furnished on application.

The directors of the Suez Canal Company decided at their meeting of April 8 to authorize passage of petroleum ships through the canal carrying oil in bulk. Hitherto only refined oil was admitted, which was a considerable inconvenience to European nations, or at least some which could, like Russia, command the market of the East; or, like England and Holland, profit by the rich deposits of the Sunda Islands The new regulations are given, in extenso, by the "Echo des Mines" of May 30.

FINANCIAL.

It is announced that the Compania de Tranvias, Luz y Fuerza of Guadalajara will build a transmission line from Guadalajara to Aguascalientes, a distance of about 125 miles. It will dispose of about 5000 horsepower in that city. The company has a capital stock of $11,000,000. Andres Bermejillo of Mexico City has been elected president of the company.

Inland Empire System.—At the annual meeting in the Terminal Building, Spokane, June 15, the directors and officers of the company were re-elected as follows: F. A. Blockwell, Chairman of the Board; Jay. P. Graves, President; F. Lewis Clark, First Vice-President; A. L. White, Second Vice-President; W. G. Davidson, Secretary; H. B. Ferris, Treasurer; Aaron Kuhn, W. G. Graves and Waldo G. Paine.

Pasco Electric Line.—Gustave Harras, of Walla Walla, has made application for a franchise to operate a street railway system at Pasco, Wash., south of Spokane. The council has asked for a statement under which the system would operate and wants a time limit to be set for the completion of a specified distance of the line, which will probably be that two miles of the system must be completed in two years. The franchise will probably be presented and granted before this year draws to a close.

Colville and Metaline.—S. H. Anschell, of Metaline, is back of a project to unite Colville and Metaline, mining towns, by a railway, forty miles. A committee has been appointed to confer with officials of the Great Northern and Jay P. Graves, president of the Spokane & Inland Empire system. The committee is composed of John B. Slater, B. H. Hammond, Sig. Dilsheimer, Hugh Waddell, W. C. Winter, A. E. Veatch, F. H. McDermott, and John D. Millspaugh. If the companies do not take up the project the people of Stevens County, Washington, will build the line, Metaline pledging itself for one-third of the capital required.

Wallace and Coeur d'Alene.—Charles Sweeny, president of the Exchange National Bank, and the Federal Mining and Smelting Company, of which he is the head, are reported to be financing the projected electric railway between Wallace and Coeur d'Alene, Idaho. The survey is through Fourth of July Canyon, in which survey was made by the Federal Mining and Smelting Company some time ago, but it was not satisfactory and H. F. Robertson, formerly locating engineer for the Inland Empire system, has been employed to secure a more satisfactory route. It is believed the purpose of the company in building the railroad is to establish a smelter near Spokane, in which event the line will be extended to that city.

Big Bend Transit.—William Nicholls, a director of the company, announces that construction work from Spokane to the junction of the Spokane and Columbia rivers will begin in a short time, eighty-five per cent of the right-of-way to Davenport, fifty-seven miles, having been secured. It is purposed to extend the line to Rickey Falls, sixty-five miles. Seven miles of the roadbed has been graded. H. W. Wallace, of Chicago, who recently made a trip over the routes, said: "There is practically unlimited power in the falls at the site secured. It is near the junction of the Spokane and the Columbia and it is perfectly adapted for such use. The river runs through a deep gorge, thirty-five feet wide at the present water line, and widening upward to about fifty feet.

Columbia and Walla Walla Traction.—J. H. Morrow, general manager, announces that he has just received the report of H. U. Wallace, of Chicago, an engineer who was sent to Walla Walla recently to make an examination of the territory through which the proposed road is to run, take a note of the physical conditions of the country on either side of the line for six miles to determine the probable freight and passenger traffic tributary to the line for the Wallace-Coats Company of Chicago. The report, which is favorable, takes in the territory originally considered between Dayton, Columbia County, and Wallula, via Milton and Freewater, also the proposed extensions on either end from Wallula to Pasco, to make connection with the principal trunk lines, and from Dayton to Lewiston, as well as the proposed connection with the Inland Empire system from Spokane at Pennewawa, on the Snake River, between Colfax and Dayton.

Spokane, Pend d'Oreille Rapid Transit.—J. J. Browne of Spokane, one of the organizers and shareholders in the company, has bought for $35,000 a terminal site on Squaw Bay, Idaho, for the line, and announces that work will be pushed on the road, forty-two miles. Construction work has been delayed by suits in the Idaho courts, but now that F. A. Blackwell has allowed the statutory time limitation in which to file notice of appeal from the judgment of Judge W. W. Wood to expire, the litigation may be regarded as ended. J. Grier Long, treasurer of the company, added: "We are to build out of Spokane from Washington Street through Pacific Avenue, which is now being paved. This will increase the expense of building about $12,000 in the part that is being paved, since the pavement must be torn up. The abutting property owners will also suffer loss, for now they must pay for the paving which the railway company would have done in the first instance but for the delay. The road will run through a country which is building up rapidly and will furnish much traffic."

Spokane.—Nine members of the Seattle branch of the Independent Institute of Electrical Engineers visited Spokane June 15 and 16 and inspected the plants of the Washington Water Power Company and the Spokane and Inland Empire Electric Railway, where on the last-named the single-phase system of transmission is employed. The visitors were piloted by J. B. Fisken and W. F. Zimmerman. H. R. Stevens, consulting engineer for the A. S. Downey Company of Seattle said at the close of the trip: "This territory has taken the lead in the matter of electric lines and transmission, being far ahead of the Coast cities in the extensiveness of its electric lines and equipment. The single-phase system of operating electric lines, as used by the Inland Empire lines, has, we believe, been shown to be a complete success." The party was composed of C. E. Magnusson, professor of electrical engineering in the University of Washington; W. S. Wheeler, franchise inspector for the city of Seattle and secretary of the Seattle branch of the national organization of electrical engineers; G. W. Pielver, general manager for the Allis-Chalmers Company at Seattle; A. C. Babcon, general manager for the General Electric Company at Seattle; C. Remschell, electric salesman for the Allis-Chalmers Company; A. L. Snyder and C. A. Sears, for the Seattle Electric Company; Fred G. Simpson, of the Kilborn-Clarke Company, and H. R. Stevens, consulting engineer for the A. S. Downey Company of Seattle. Professor Magnusson was elected delegate to the national convention at Niagara Falls.

FINANCIAL.

San Francisco.—The Metropolitan Light and Power Company, successors to the San Francisco Coke and Gas Company, has given a mortgage to the Knickerbocker Trust Company on all its properties to secure a bond issue of 5 per cent forty year bonds to the amount of $7,500,000. A former bond issue of $2,500,000 is to be retired, and with the $5,000,000 remaining the company purposes an extensive development of its plant.

Alameda.—At a meeting of the City Council last week a resolution was adopted instructing the City Attorney to begin an action against the Oakland Traction Company for the purpose of forfeiting the company's franchise on Park street, from Santa Clara Avenue to Harrison Avenue, about a half a mile of the road. This demand for forfeiture is based on the charge by the city that the company is not acting in good faith. The company will resist the efforts of the city authorities to invalidate the franchise.

Redding.—J. A. Whitehead, President of the Pacific Power Company, D. D. Egilbert, former Secretary of the company, and L. A. Bauter, who has served a brief term as Secretary subsequent to Egilbert's recent resignation, have been cited to appear before Judge Bush in the Superior Court and show cause why they should not be punished for contempt, in connection with the writ of mandate issued by the Court on May 23d, commanding W. D. Egilbert, as Secretary of the company, to exhibit the corporation's books to T. W. H. Shanahan, a stockholder, who had been denied access to them. The Court placed the order in the hands of the Sheriff and W. D. Egilbert and L. A. Bauter were served with the notice, but Whitehead could not be found.

Bakersfield.—The assessment of the Standard Oil Company's pipe line will be placed at $2,750 a mile. That was determined at a meeting of Assessors of the counties through which the pipe line runs, held in Visalia. These counties are: Alameda, Contra Costa, San Joaquin, Stanislaus, Merced, Fresno, Kings, Tulare and Kern. Assessors from all these counties were represented at the Visalia meeting, either in person or by letter. At a previous meeting it was decided to raise the assessment from $2,000 a mile to $3,000. The Standard protested against this increase of a third, claiming that the line had deteriorated by the action of the alkali on the pipe. Representative Morrow, of the company, had been to see the various Assessors. Various Assessors agreed to lower the assessment if others would, and the result was the calling of the meeting. The Standard tried hard to get the assessment reduced to $2,250, but this was opposed vigorously by some of the Assessors, and finally $2,750 was agreed upon as a fair figure.

San Francisco.—The Supervisors have voted to give the Spring Valley Water Company such aid as will enable it to go ahead with its projects for insuring additional fire protection. This promise was given in response to a communication from the Merchants' Association calling on the Board to incorporate in the budget an appropriation of $239,000 to the Spring Valley Company to insure these improvements. The proposition was to vote $180,000 for the use of water hydrants, $20,000 in public buildings, $10,000 for the streets, $15,000 for the schools and $14,000 for the parks. The suggested amendment to the budget was not made, but Mr. Gallagher, speaking from the Chair for the Board, said: "The Board, during the year to come, will make such appropriation as will give the Spring Valley no excuse for not bringing in sufficient water for fire and other purposes. While the budget should be finally passed now without further amendment, I am confident that the Board will find money in the surplus funds for the Spring Valley."

San Francisco—Affidavits and comparative tables covering two hundred typewritten pages have been prepared by City Attorney Burke and his Chief Assistant, Wm. T. Baggett, in answer to the application of the Spring Valley Water Co. for an injunction restraining the city from putting into effect the ordinance fixing water rates for the fiscal year, which is to begin July 1st. It is the contention of the water company that the ordinance would reduce its earnings to such an extent that under the changed conditions, due to the earthquake and fire, it would not be able to pay even its fixed charges, such as operating expenses, taxes and the interest bonded indebtedness. In the answer, which is to be filed to-day, in behalf of the city, stress is laid on a comparison of the ordinance at issue and the ordinance of 1902, under which the water company has been collecting rates for five years. A summary of what the city says on this point has been compiled in the City Attorney's office. It is contended that the company can afford to accept the proposed rate ordinance.

INCORPORATIONS.

The C. C. Harris Oil Company has been incorporated with a capital stock of $1,000,000 by C. C. Harris, E. E. Cates, N. L. Bryant, W. A. Martin and A. M. Gates.

Fresno.—The Mountain Girl Oil Company has been incorporated with a capital stock of $350,000, by T. G. Hart, F. M. Helm, Jacob Clark, J. A. McClurg, Jr. and A. W. Anderson.

San Luis Obispo.—The Nipomo Oil Company has been incorporated with a capital stock of $500,000, shares $1 each. Directors: Frank Dana, W. A. Bumgartner, Hans Melschau and others.

Sonora.—The La Grange Water and Power Company has been incorporated with a capital stock of $100,000, shares $100 each. Directors: J. P. O'Brien, E. P. Epperson and E. W. Billeb.

Los Angeles.—The Imperial Water Company, No. 10, has been incorporated with a capital stock of $500,000, subscribed, $50. by R. C. Powers, Wm. Farr, Thos. O'Brien, G. M. Purcell and T. J. Turner.

Napa.—The Calistoga Water Company has been incorporated with a capital stock of $75,000, shares $100 each, subscribed $300, by E. L. Armstrong, C. M. Hover and Raymond Benjamin, 1 share each.

Fresno.—The Kern Trading and Oil Company has been incorporated with a capital stock of $1,000,000, subscribed in full, by Julius Kruttschnitt, $998,000, J. H. Wallace and W. A. Worthington of San Francisco, J. L. Wilcutt of Oakland and J. E. Foulds of Berkeley, $500 each.

The Compania Hidro-Electrica San Agustin, which was recently organized at Puebla, Mexico, with a capital stock of $1,000,000, will install a hydro-electric plant and furnish the city of Puebla with light and power. Fernando Pimentel y Fagoaga is president of the company.

ILLUMINATION.

Oroville, Cal.—The maximum rate which the local electric light company will hereafter charge for lights, where meters are used, is eight cents per watt. This is a reduction of four cents on the present rate, and is the result of the Board of Trustees elected to cut the rates keeping their ante-election promises.

Santa Rosa, Cal.—Chief Engineer E. C. Jones, of the gas department of the Santa Rosa Lighting Company, stated that work would begin in the near future on the construction of the additional holder. It will be 100,000 cubic feet capacity, and the framework is being manufactured at the present time.

San Francisco, Cal.—The San Francisco Gas and Electric Company has submitted to the Board of Supervisors bids for lighting the public streets and outlying districts at the rate of 8.7 cents a lamp each night for gas and 20 and 713-1,000 cents for electric arc lamps per night. The bid for lighting public buildings is 60 cents for each 1,000 cubic feet for gas, and 4 cents per kilowatt for electric current. The bids, which are the only ones filed, have been referred to the Light Committee.

Portland, Ore.—The Economy Gas Company, which has secured a franchise from the city by vote of the City Council, has refused to admit the company to the use of the streets or pipes in competition with the Portland Gas Company. The company is controlled by E. E. Lytle and R. W. Colson, who hold eighty per cent of the stock. They will begin laying pipes, in a short time, in the streets, and expect to be attacked by the Portland Gas Company, in the courts, in a suit to enjoin their company from using the streets. The Portland Gas Company holds a franchise granted by the Territorial Legislature of Oregon, January 7, 1859, authorizing Henry D. Green and his successors to establish a gas manufactory in the City of Portland, Multnomah County, Territory of Oregon, conveying to Green and his successors "the sole right and use to lay and extend throughout the said City of Portland," for an indefinite period. The new franchise provides that work shall begin within six months from the date of acceptance of the franchise by the company, "unless delayed by judicial action or causes not the fault of the grantee." The cost is to be approximately $1,500,000. The company is required to spend $5,000 a year for maintenance of the plant. The company is not to charge more than ninety-five cents per 1,000 feet for gas, but the company expects to charge seventy-five and eighty-five cents. The duration of the franchise is to be twenty-five years. One per cent of the gross earnings is to be paid to the city. The new company is to give $5,cco bond to the city for performance terms of the contract, and after three years is to be delivered of the bond, if by that time it has spent $250,000.

TELEPHONE AND TELEGRAPH.

Red Bluff, Cal.—Supervisors—An application has been made by Attorney Wells for a franchise for a pole line on which to string a telephone wire between Red Bluff and Tom Head Mountain. The franchise is for the California & Massachusetts Copper Mines Company.

Coalinga, Cal.—J. N. Wheeler has asked what steps the city demands should be taken in securing a franchise for an independent telephone company which desired to do business in Coalinga. He was informed a petition in the form of an ordinance would be necessary to grant the franchise, and is having the petition prepared and will present it at a later meeting.

OIL.

The Section 6 Oil Company, just northwest of the Alladin, has now struck sand at 2,040 feet. The sand from this well looks unusually rich and from all indications the well when completed will prove a great producer.

The Shreeve well, located west of the Alladin Oil Company, will soon be in producing condition. This well showed unusual gas pressure while being drilled, and but for a mishap in casting off the water would be equal to the Lucile as a producer.

The St. Francis Oil Company have their rig completed and are placing the machinery in position preparatory to starting work immediately on their land, located on Section 6, southwest from the Alladin. The Lucile gusher still maintains its great flow, and although almost a year old both gas pressure and production of oil is much better now than it has been since the well was brought in.

Bakersfield.—According to the latest news from the Coalinga oil fields the greatest activity prevails at present in the West side in the territory on and surrounding the north half of Section 6, on the outskirts of the town of Coalinga. In the very heart of this district is located the Alladin Oil Company, just adjoining the famous gusher of the Lucile Oil Company. The only thing which prevents the beginning of much new work is scarcity of material, such as lumber, casing, etc. Prominent oil operators from all portions of the State are visiting this district, and property in the proven belt is rapidly being bought up. The Associated Oil Company, on Section 36, adjoining the north half of Section 6, has four standard strings and one rotary well drilling and is now erecting a new steel tank of 35,000 barrel capacity and a pumping station.

WATER WORKS.

Redwood—Plans for a new water system here for adequate protection against fire have been taken under consideration by the Town Trustees. At the last meeting of the Trustees a communication was received from the Board of Trade to the effect that that organization would aid in the work to safeguard property. It is believed that a site will be purchased in the foot hills and a reservoir constructed or a stand pipe system installed. At present the water pressure is low and impractical in fighting fire.

Redding—The Northern California Power Company has begun the erection of a boiler shop building on the site of Smith's lumber yard, on South Street. In this shop will be made all the steel pipe the company will need at its Battle Creek power plant. The shop will become a permanent fixture in Redding, and aside from doing work for the power company will do custom work for all comers. It will probably give employment to fifteen or twenty men.

C. H. Hollingsworth, Superintendent for the Great Western Power Company, at Island Bar, has resigned his position to go with his family to his home in the East. His successor is B. S. Roberts, who has resigned from the Southern Pacific to take the place. Mr. Roberts is a well-known engineer. He recently completed the Bay Shore cut-off near San Francisco for the Southern Pacific. W. H. Bissell, formerly purchasing agent for the Great Western Power Company, has been promoted to the position of Assistant Superintendent.

POWER AND LIGHT PLANTS.

Chewelah, Wash.—The city will erect a water and light plant to cost $14,000, and be completed by October 1st.

Lewiston, Ida.—Preliminary work on construction of a big power plant for the Lewiston & Southeastern Railway has commenced.

Marysville, Cal.—The California Midland Co. has advertised for bids for the grading on the main line of their road to Grass Valley and Nevada City. As soon as the bids are in, and the contract let, work will be rushed on this branch. The company expects to have their line completed to Hammonton City, Cal., the first of October, a distance of eleven miles. Eight miles is on the main line to the above mentioned towns, while three miles will be taken up by a spur into Hammonton. The rails will be laid two-thirds of this distance along the south levee of the Yuba River.

The first annual convention of the Illuminating Engineering Society will be held at Boston, Mass., Tuesday and Wednesday, July 30 and 31, 1907. The program as to hours and number of sessions will be announced later, but from the material already in the hands of the various committees and the promise of many additional valuable papers and exhibits, there can be no question of the assured success of the convention and its educational value to each and every member.

TELEPHONE AND TELEGRAPH.

San Francisco, Cal.—The Pacific Tel. & Tel. Co. offer a $500 reward for the arrest and conviction of any person or persons cutting or injuring the overhead or underground cables or wires of the company. The strike of the linemen against the telephone company is practically ended. The linemen either will return to work before midnight next Tuesday or their places will be filled by members of the International Brotherhood of Electrical Workers.

TRANSMISSION.

Willows.—Charles H. Glenn, one of the promoters of the Snow Mountain Power Company, says that all of the first issue of the stock had been sold. This stock was disposed of mostly in Colusa County. Work has been commenced on the large plant, and by next November power will be furnished for various counties. Mr. Glenn says that he expects to see an electric line running up Bear Valley in the near future, and also prophesies that the line will be extended to the Fouts Springs. At the last session of the Board of Supervisors Richard Bane of San Francisco, who is acting as attorney for the power company, made application for a franchise to run a line throughout the country for the purpose of furnishing power at various points. There is also a rumor to the effect that the Willows Water and Light Company will consolidate with the Snow Mountain Company.

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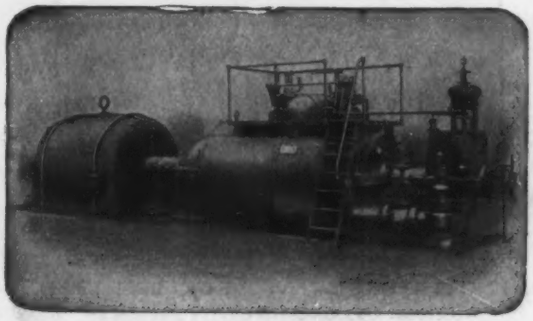

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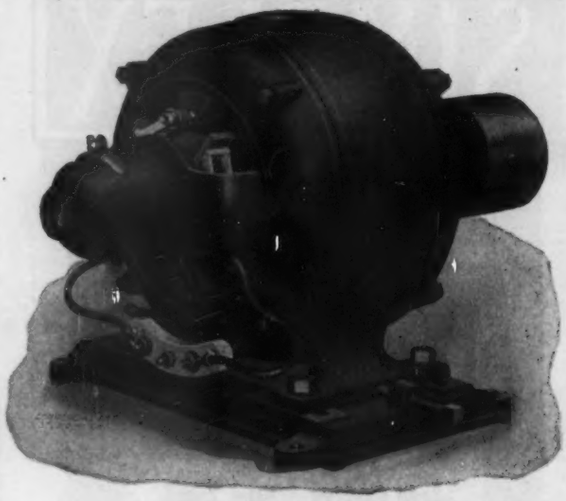

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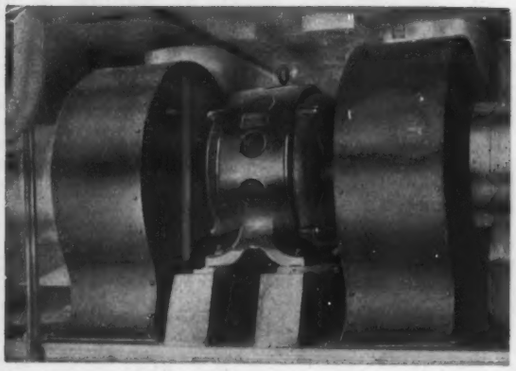

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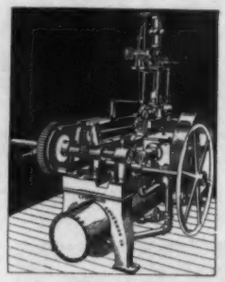

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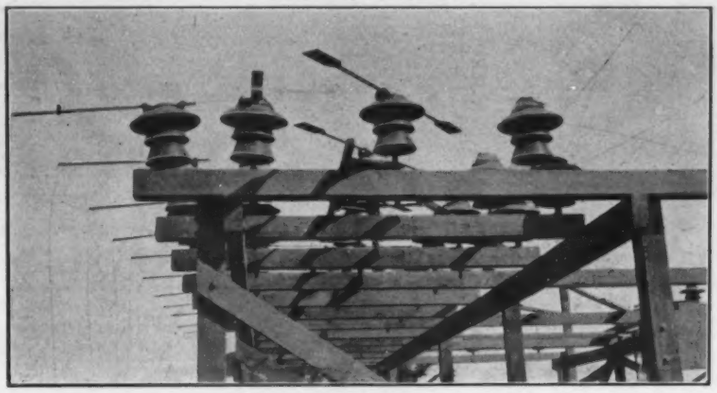

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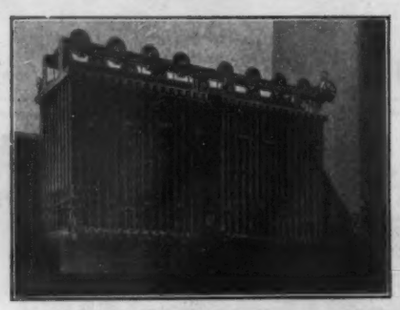

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INCORPORATIONS.

San Francisco.—Amended articles of incorporation for the Santa Clara Interurban Railroad Company, of which L. E. Hanchett is President and S. S. Baldwin Secretary, have been filed with the County Clerk, the new articles having been adopted at a meeting of the directors on December 5th. The new electric road will be built from San Mateo to Alum Rock Park, near San Jose, and will pass through Redwood City, Menlo Park, Palo Alto, Mayfield, Mountain View, Sunnyvale, Santa Clara and San Jose. The total length will be about 40 miles. The capital stock of the company is $5,000,000, of which $50,000 has been subscribed. The directors are: J. C. Campbell, E. M. Rea and W. H. Metson of San Francisco, and J. F. Parkinson and Frank D. Dorman of Palo Alto.

Lakeport, Cal.—The Lake County Paraffine Oil and Gas Company has been incorporated with a capital stock of $500,000, by J. S. Clark, J. E. Fulton and others.

Oakland.—The White Diamond Water Company has been incorporated with a capital stock of $50,000, by T. G. Ryker, T. S. Gray, I. N. Clay, C. T. Walker and A. R. Baum.

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POWER.

Santa Ana, Cal.—The Edison Electric Company is installing numerous pumping motors on various ranches in the vicinity of Garden Grove, for which there seems to be a large demand.

City of Mexico, Mex.—E. J. White, Superintendent in charge of the construction of the Peregrina mill, in the Huanajuate district, has gone to the United States to purchase machinery and other supplies for a big hydro-electric plant, which will be erected to furnish power for the various mills of the associated companies in which the Pinguico, Peregrina, Central and Cubo and other mills and mines are comprised.

Bisbee, Ariz.—The people have voted to grant a franchise to the International Gas and Light Company.

Ukiah.—The Fort Bragg Electric Company has applied for a franchise, for which sealed bids will be received up to February 4th, for the right to string wires for heat, power, etc., on certain highways in Mendocino county.

San Francisco.—A lockout, which will invole nearly 300 workmen and tie up building for a considerable time, is threatened. Representatives from seventy contracting electrical firms met at 707 Van Ness avenue recently and formed the Electrical Employers' Association. The object of the organization is to fight the demand for a minimum wage scale of $6 a day, which the members of the Independent Brotherhood of Electrical Workers will try to put into effect after January 1st.

FINANCIAL.

Stockton.—An attempt will be made to raise a bonus of $20,000 in Stockton and vicinity to build an electric road from Byron to this city. Local capitalists have promised to subscribe liberally. If the bonus can be raised the proposition of financing the road will be taken up by the Central California Traction Company, which owns the street car lines in Stockton and has intimate business relations with the American River Electric Company.

Los Angeles.—The special board of engineers consisting of three experts, engaged at a cost of $7,500 each, to pass upon the proposition of a water supply for Los Angeles to be derived from the Owens River in Inyo County, has made public its report on the subject. The report estimates the total cost of conduit and all accessories at $28,485,000.

San Francisco.—The Electrical Employers' Association held a meeting on Saturday and resolved to resist the demand of Electrical Workers' Union No. 6 for an increase of wages of $1 a day for journeymen and $1.50 a day for foremen. The employers stated that the union men had received an increase from $4 to $5 a day five months ago; that every employer has contracts on hand based on the present wage rate, and that an increase would entail considerable loss. The union men struck January 2d.

Oakland.—Mayor F. K. Mott has been offered the management of the People's Water Company, which some months ago absorbed the Contra Costa and the Syndicate companies.

FOR GAS COMPRESSORS see RIX C. A. & D. CO., S.F.

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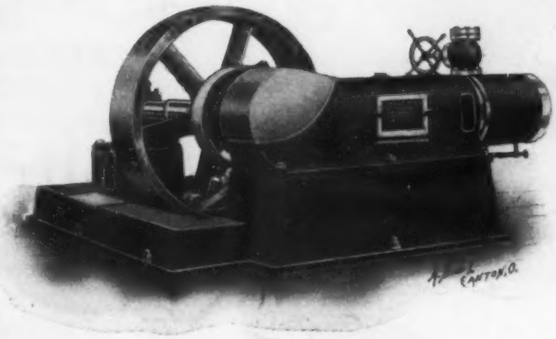

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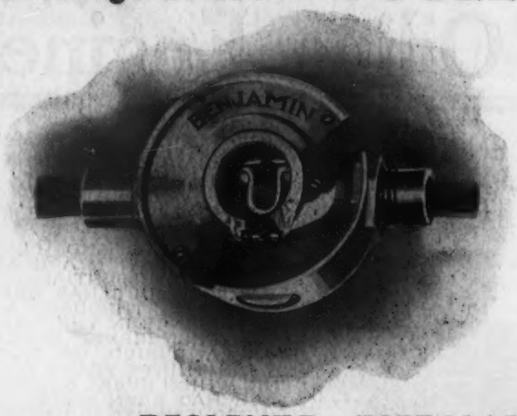

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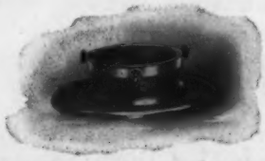

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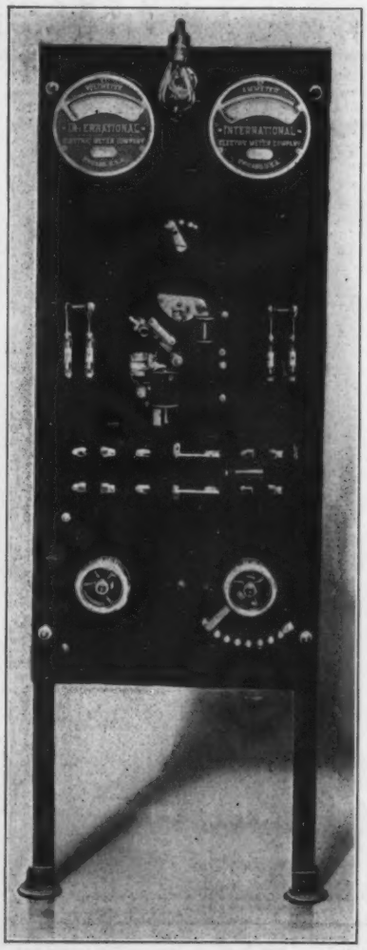

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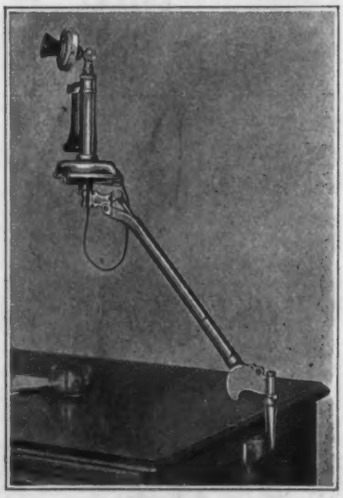

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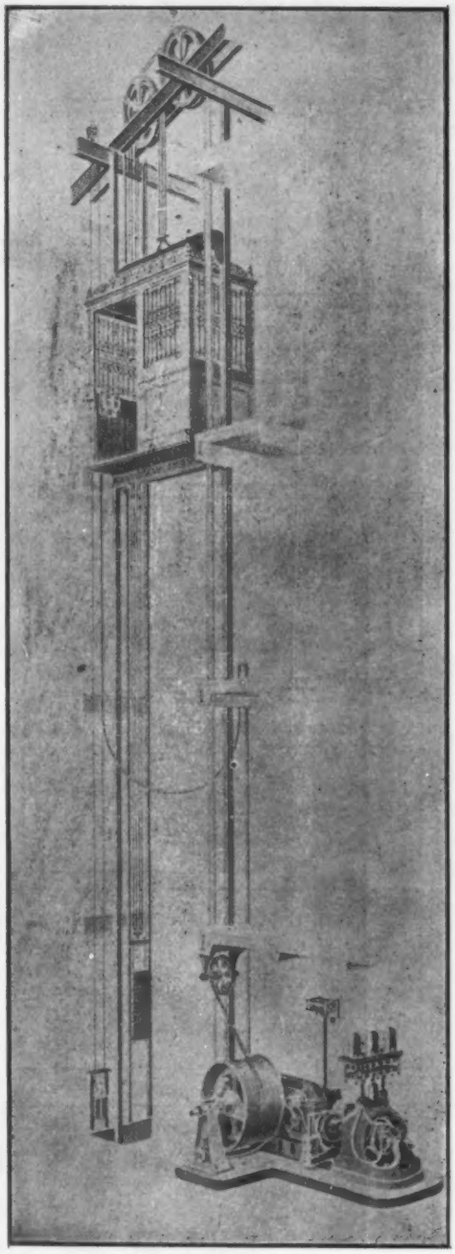

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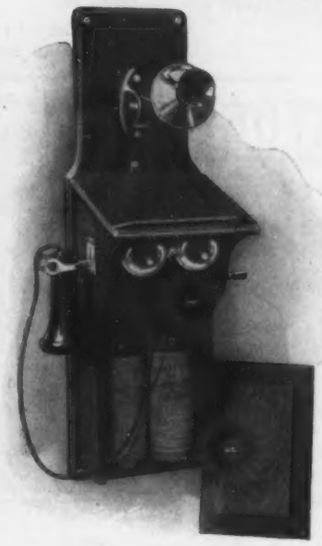

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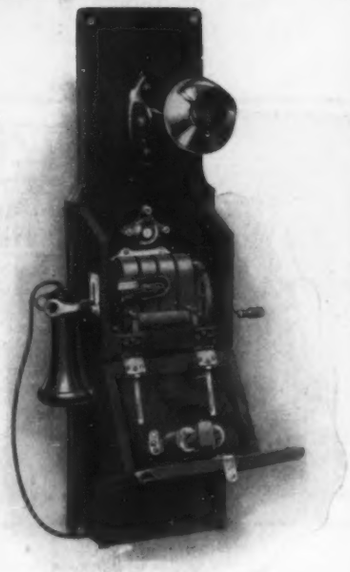

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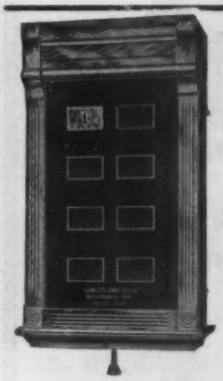

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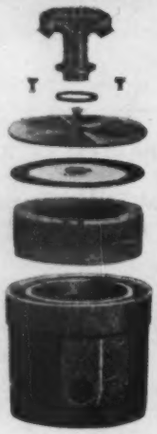

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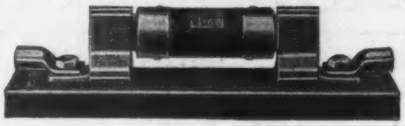

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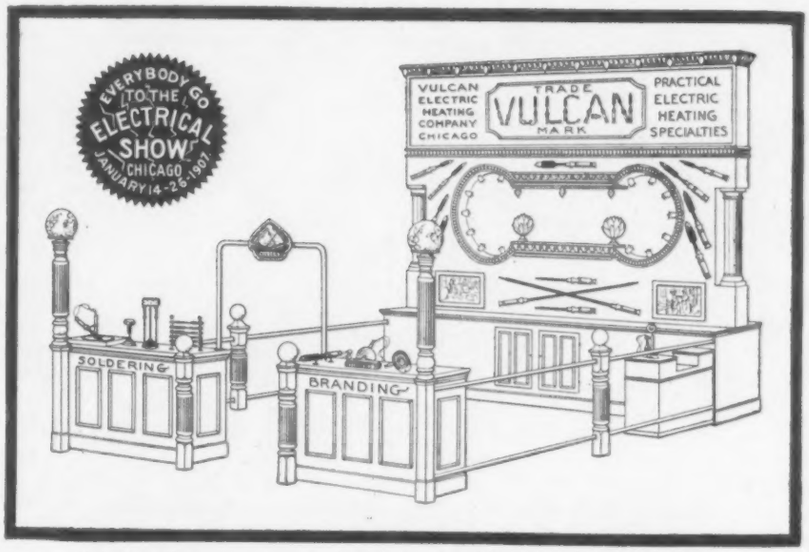

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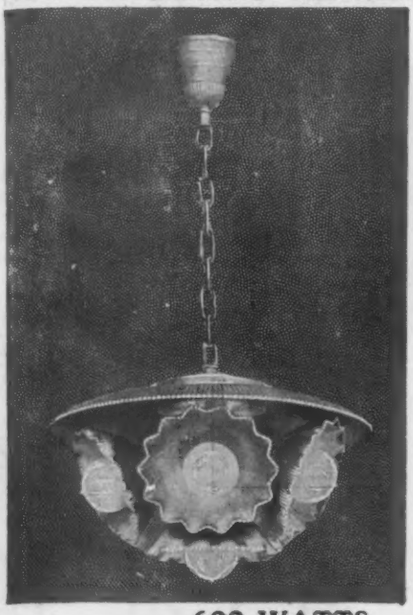

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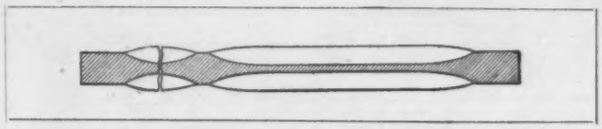

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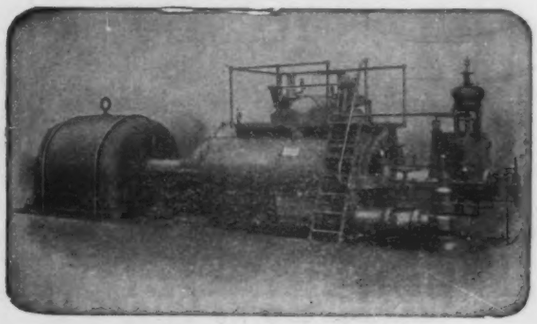

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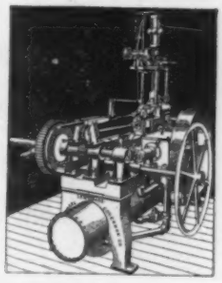

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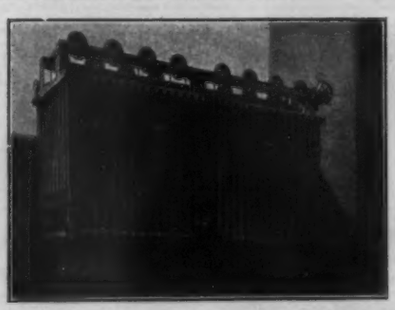

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Spokane, Wash.—It is reported that $2,000,000 will be completed and in operation by spring of 1909.

Tacoma, Wash.—Three ordinances will be introduced amending E. J. Felt's franchise for street car lines in the city.

Tacoma, Wash.—The N. W. Bridge Co. will begin work at once on the new interurban shore line between this city and Seattle to be built for Messrs. Muckler, Weighman and associates.

Tacoma, Wash.—General Manager Dimmock states that work has been commenced on the interurban line betwen Tacoma, Sumner and Orting.

Waitsburg, Wash.—Council granted a franchise to the Columbia & Walla Walla Traction Co. to construct lines through the city.

Butte, Mont.—The Butte Electric Ry. Co. will, in the Spring, extend its South Butte line to the new Gallatin ad-d'tion.

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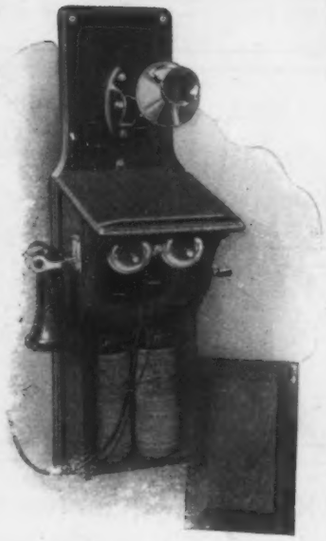

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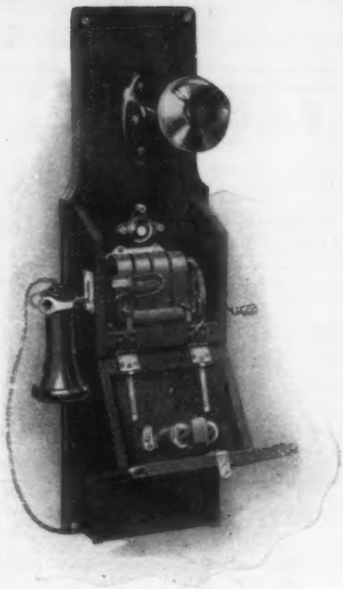

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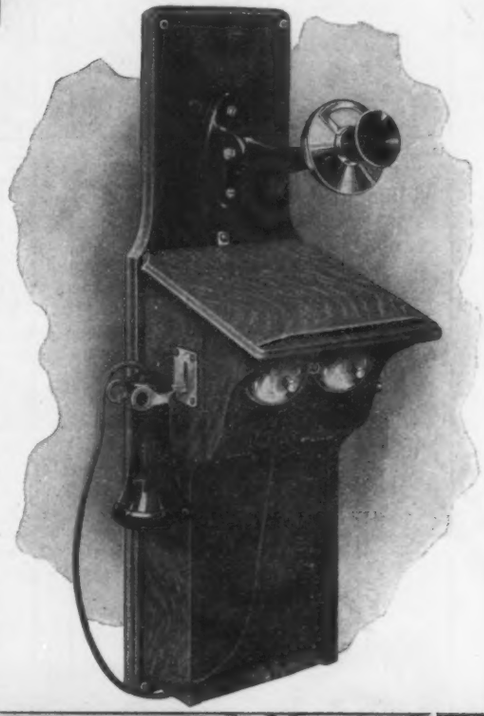

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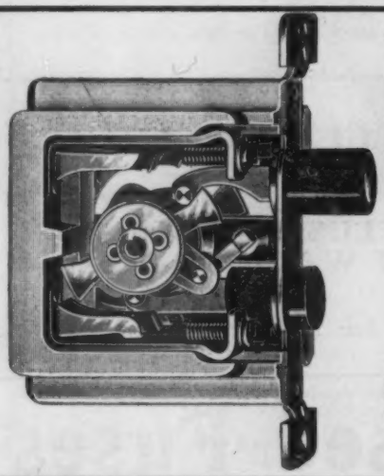

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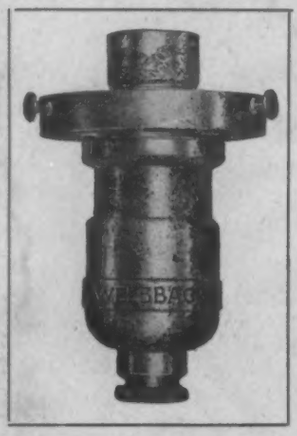

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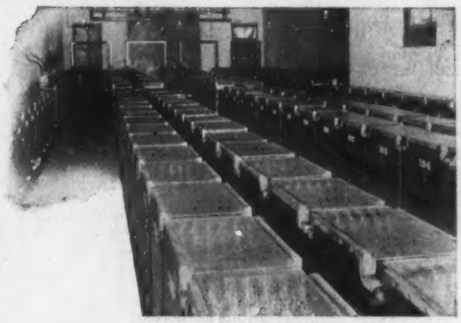

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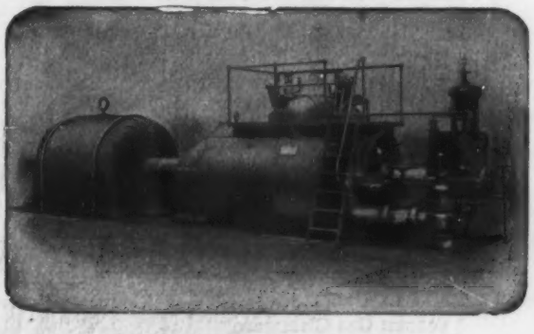

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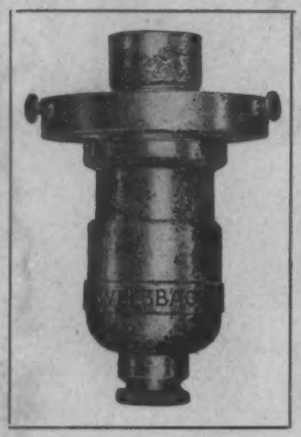

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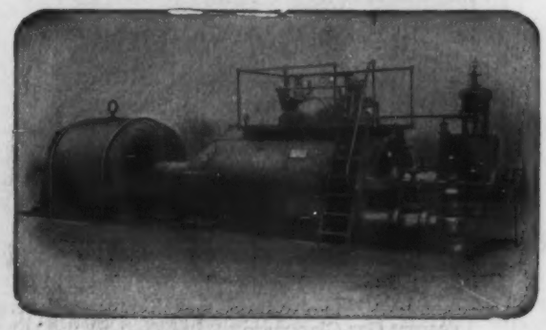

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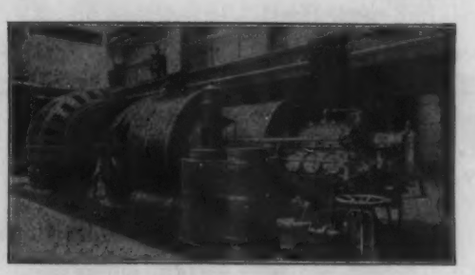

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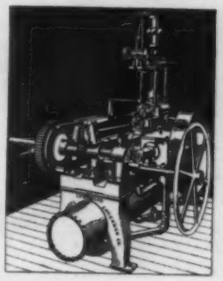

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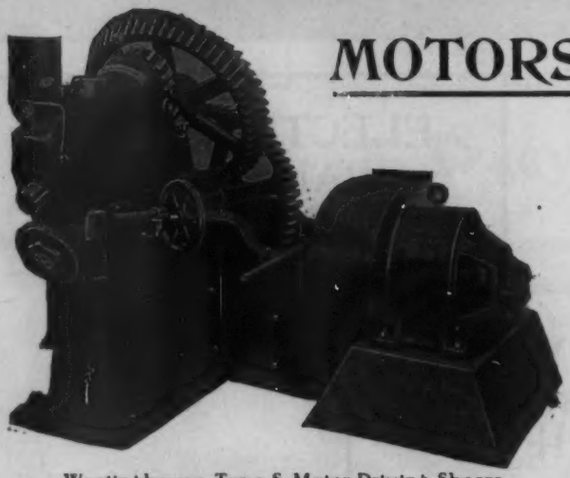

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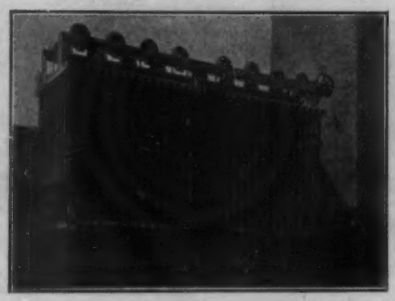

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Ashland, Ore.—R. McMurphy and associates have applied for a 25-year franchise for a gas heating, light and power plant.

Kalispell, Mont.—The Flathead Valley Water Power Co. has incorporated with a capital of $350,000, by A. W. Howard, Russell M. Simmons, P. H. Bartline, Warren Nichols and H. D. Folsom, Jr.

Tenino.—W. A. Freeburger of Montesano has purchased a controlling interest in the plant of the Tenino Light & Water Co.

Trent, Wn.—Work has been started by the Trent Power and Irrigation Co. on the power plant which is to develop 1500 horsepower.

Castle Rock, Wn.—The St. Helena Mill & Power Co. of Oregon, has been granted the water right to the outlet of Spirit lake and the right of way for about six miles of flume line. The company will use the water power to generate electricity for general electric purposes.

Coeur d'Alene, Ida.—Frank Rice and associates have applied for a 20-year gas franchise.

Marshfield, Ore.—The Coos Bay Power & Water Co. capital $5,000, has been incorporated by Everett Bingus, L. J. Simpson, W. T. Chandler, W. F. Squint, John Pruess, J. A. Matson and John S. Coke.

Pasco, Wn.—Work has been commenced by the Pasco Water & Power Co. to install the electric lighting system.

Seattle.—The Seattle-Tacoma Power Co. has applied for a permit to locate a temporary power house in Union street, near Western avenue.

Spokane.—The W. W. P. Co. will extend its high power line to the National mine, near Mullan.

Spokane, Wash.—The Pacific States Telephone & Telegraph Company announces it will expend more than $175,000 in improving its service in Spokane and the surrounding towns next spring. Plans have already been prepared, and it is expected work will begin soon after the meeting of the Board of Directors in February. The chief fight in Spokane is against the Home Telephone Company, but it is predicted that it will be made in every city in the Northwest in which the company comes into competition with the Pacific States Company, in Spokane to the northern part of Washington.

Spokane, Wash.—The Home Telephone Company is to have long distance connection between Spokane and Pacific Coast points. Arrangements have been made between the Puget Sound Telephone Company, by which the Spokane branch will be connected with points on the Coast, from Seattle to San Francisco. The company announces its intention to give direct connection with the business centers in the west. It is expected that connection with long distance points in Idaho and Montana will be secured through the Interstate Telephone Company. Announcement is also made that it is intended to put in systems in all small towns in this section of the country, so that local business may be carried on. A double exchange system is to be installed in Spokane. The power for the local phone is to be supplied from the central station.

Spokane, Wash.—S. H. Sauve, president of the Sauve Electric Company, of Spokane, has received an offer from Coeur d'Alene, Ida., to build a plant for the manufacture of his coil, which has been patented in the United States, Great Britain, France and Italy.

Spokane, Wash.—A. G. Flandus, of Newport, and M. R. Woodson, manager of the Pend d'Oreille River Navigation Company, have received a franchise for a telephone line from Newport and Blue Slide, in Stevens County, and is purposed to connect with an independent line.

MINING.

Anaconda, Mont.—The Butte-Milwaukee Co. is installing new machinery at their new mine.

Anaconda, Mont.—The South Butte Copper Mining Co. with a capital of $1,000,000 has been incorporated by F. E. Whitehead, H. J. Giltory, and R. H. Shaeffer. The company owns eight claims south of the city.

TELEPHONES AND TELEGRAPH.

Anaconda, Mont.—The R. M. Bell Tel. Co. is installing a common battery system.

Baker City, Ore.—R. C. Robertson and associates of Portand have applied for a 20-year franchise for a new telephone system.

Caldwell, Ida.—Henry W. Dorman has applied for a franchise to construct and operate an electric line in the city.

Edmonton, Alta.—The public works department of the Alberta government is arranging to build a telephone line from this city to Lloydminster.

Helena, Mont.—The Montana Independent Tel. Co. has had plans drawn for the erection of an exchange at this place to be completed June 1st.

Kent, Wn.—A. F. West has applied for a franchise for the erection and maintaining of a system of telephone or telegraph lines in Kent.

Sherwood, Ore.—The Sherwood Mutual Tel. Co. has been incorporated by J. P. Young, L. S. McConnell and Ferd Langer.

Wilson Creek, Wn.—The Wilson Creek Tel. Co. will incorporate with a capital of $2,500.

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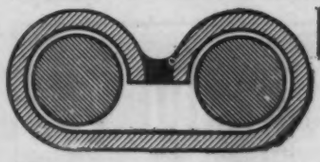
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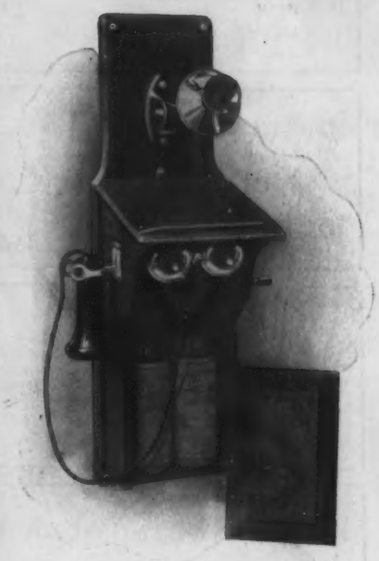

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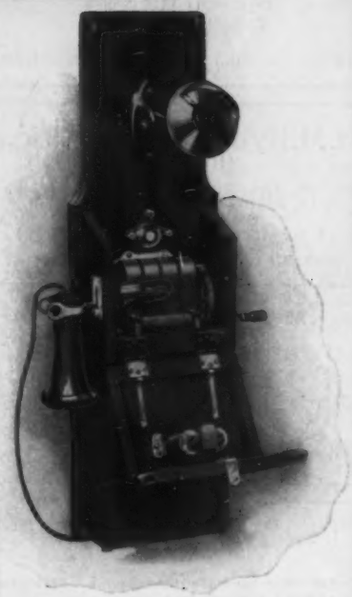

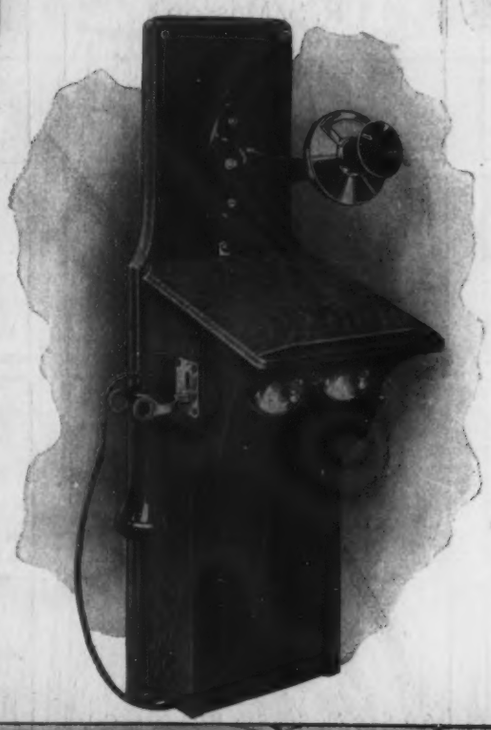

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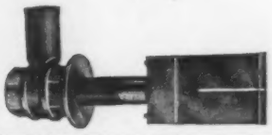

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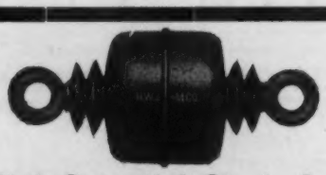

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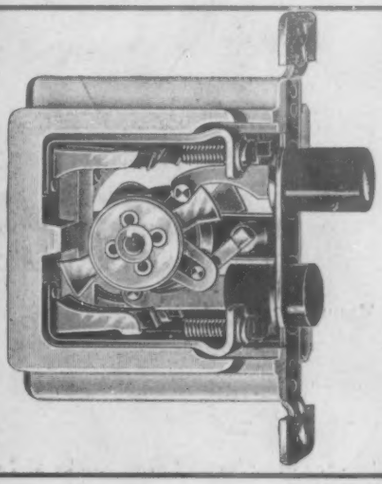

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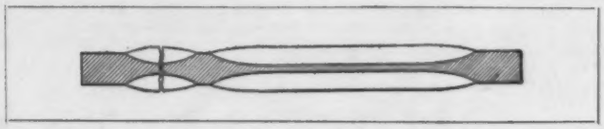

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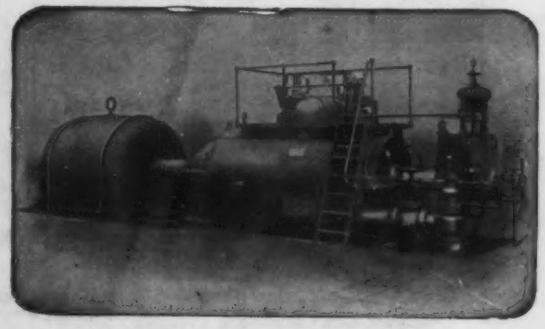

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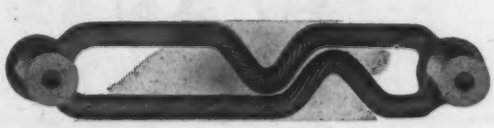

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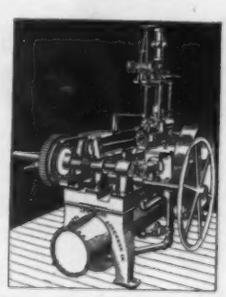

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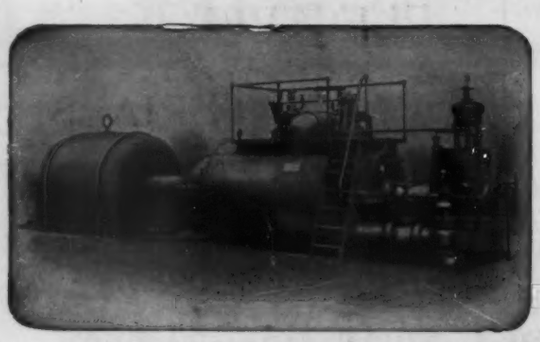

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New York.—A syndicate composed of J. P. Morgan & Co. and Kuhn, Loeb & Co. of this city, Kidder, Peabody & Co. of Boston and Baring Bros. and J. S. Morgan & Co. of London has purchased $25,000,000 three-year 5-per-cent notes of the American Telephone and Telegraph Company. The notes are dated January 1, 1907, and all have been sold, European investors having taken a large share.

Martinez.—Articles of incorporation of the Pacific States Telephone and Telegraph Company have been filed here and a copy of the same forwarded to the office of the Secretary of State by the Pacific States Telephone and Telegraph Company, with a capital of $50,000,000, divided into 500,000 shares of $100 each. Of this 320,000 is preferred stock and 180,000 common stock. The subscribers are Henry T. Scott, 5000 shares; E. S. Pillsbury, 3500 shares and 100 shares subscription from C. O. Hooker, E. J. Zimmer, George Newhall, Edward Coleman, G. C. Carroll, T. E. Sherwin, G. B. Robinson, H. C. Breden, C. E. Greene, T. Hopkins, W. S. Martin, J. M. Quay, M. R. Jones, A. V. Dunkel and R B. Borland.

Alameda.—The City Council has ordered City Attorney Simpson to commence proceedings against the Oakland Traction Company to compel the traction company to macadamize and grade that portion of Webster street across the marsh occupied by the company's tracks. The tracks are on grade, but the roadway is from twelve to sixteen inches below the grade, and teams are barred from crossing or driving on the trackway. The Council wants the company to put its half of the roadway in condition for use of vehicles, so that the other half of the roadway can be improved by the city. City Attorney Simpson says that he will probably bring an injunction suit against the company, a new mode of procedure in litigation of this kind, brought under a recent provision of the injunction law.

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San Francisco.—In connection with the plans made for a vigorous pushing of the extensions to the Bell telephone system on the Pacific Coast, the Pacific Telephone & Telegraph Company, organized under the laws of the State of California, has authorized an issue of first mortgage and collateral trust 5-per-cent sinking fund bonds, $3,000,000 of which are being offered for public subscription by N. W. Halsey & Co. in San Francisco, New York, Boston and Chicago. The new company is issuing $17,000,000 common and $17,000,000 preferred stock in exchange for the outstanding stock of the Pacific States Telephone & Telegraph Company, and an additional $1,000,000 of its stock for working capital. The proceeds of the bond issue will be used for the reconstruction and extension of toll lines and general reconstruction of exchange plants, the improvements and extensions referred to including the enlargement and betterment of plants in San Francisco, Oakland, Los Angeles, San Diego, Santa Barbara, Riverside, Bakersfield, Pasadena, Fresno, Stockton, Sacramento, Eureka and San Jose, as well as in the leading cities in the Northwest. The new bonds, it is stated, are a first lien on a majority of the company's system extending from Vancouver on the north to San Diego on the south, making 90,000 miles of toll lines with 240,000 subscribers. On the property acquired from the old Sunset property, the new bonds are to be a refunding mortgage. The net earnings of the company, after payment of operating expenses, maintenance and taxes, are given as $1,917,968 in 1905 and $1,648,030 in 1906, the decline in the latter year being due to conditions incident to the San Francisco fire. It is pointed out that even this reduced total, which may be considered the minimum earning power of the company, is three times the interest charge for 1907.

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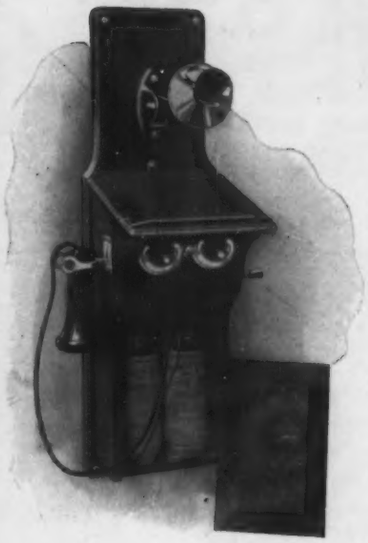

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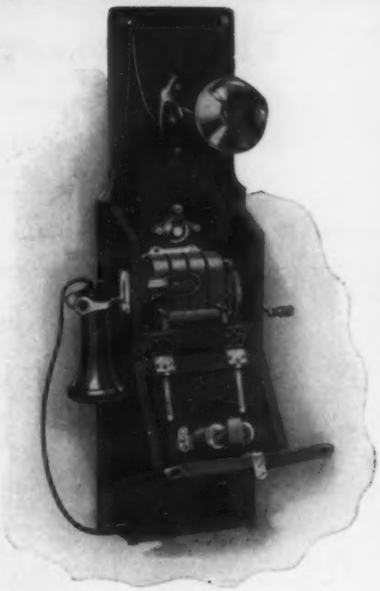

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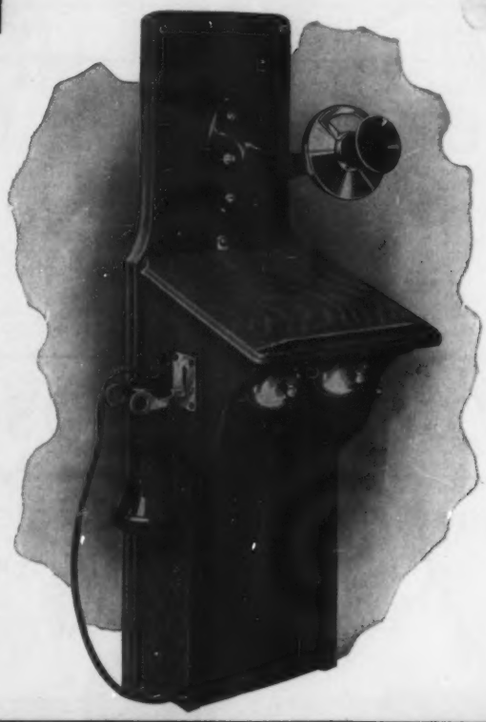
For further information, ask for our bulletin No. 101-F, which illustrates and describes with circuits our complete line of local battery telephones.



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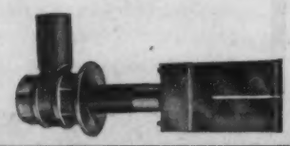

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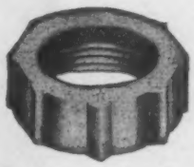

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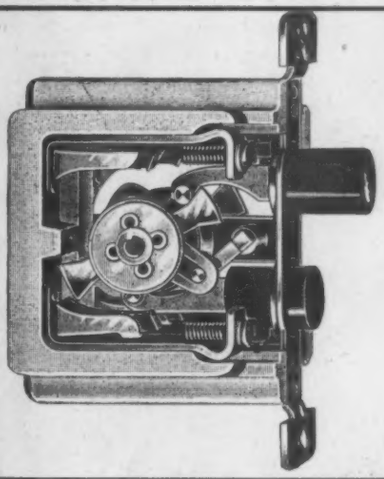

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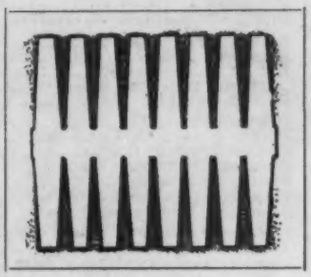

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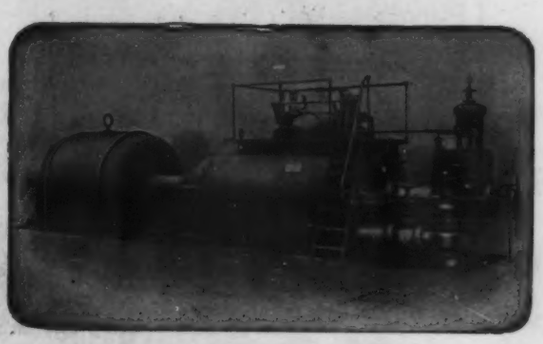

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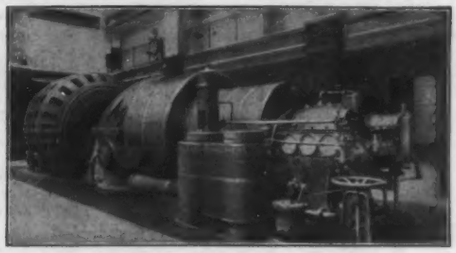
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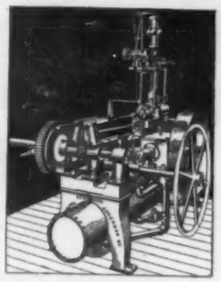

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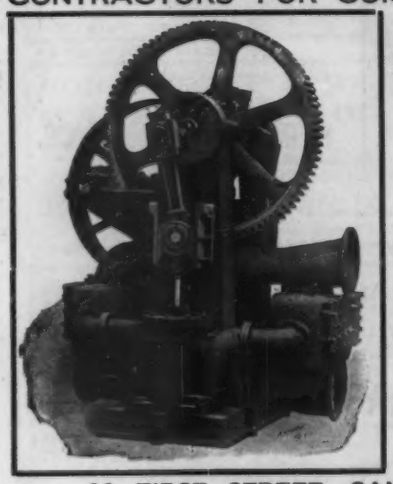

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FINANCIAL.

San Francisco, Cal.—Those behind the merger of the Bell telephone companies of the Pacific Coast into one corporation, the Pacific Telephone and Telegraph Co., declare that their success is assured. Under the plan of the merger, there will be $18,000,000 worth of six per cent. preferred stock and $18,000,000 worth of common stock outstanding. The company declares that bonds to the extent of $3,000,000 have already been issued. The following statement was given out this week: "The California subscriptions received for the first-mortgage bonds, issued in connection with the financing, exceeded expectations, covering practically the entire issue which the company desires to sell at this time. At the request of the Boston correspondents of N. W. Halsey & Co., the bankers who are handling this issue, it is probable that a few days will be allowed for the receipt of subscriptions from New England, where control of the Pacific Telephone and Telegraph Co. is held, before the matter is entirely closed. The successful placing of this bond issue puts the company in funds to proceed aggressively with the plans undertaken for extensive improvements in practically all the important cities on the Pacific Coast. The San Francisco and Oakland systems are to receive special attention, the equipment to be of the most modern type, capable of giving the company's patrons the most efficient service which the present advanced state of the art permits."

San Francisco, Cal.—The Pacific Gas and Electric Co. has redeemed $250,000 worth of its bonds at an average of 87½. The highest paid was 89. Some of the offers ran as high as 96. It was the first annual redemption of the new bond issue of that company for $10,350,000, issued in January, 1906, at 5 per cent. per annum.

San Francisco, Cal.—At the last meeting of the board of directors of the Northern California Power Co. Edwin Goodall was elected a director to fill the vacancy caused by the death of James Coffin, who died some days ago. The directors of this company now are: H. H. Noble, J. Henry Meyer, C. R. Downs, Edward Coleman and Edwin Goodall.

San Francisco, Cal.—There have been numerous reports regarding the status of the regular dividend of the Associated Oil Co., recent news from the South stating that it would be paid. A decision upon the matter is expected within the next few days.

Bakersfield, Cal.—The Mariposa Road Oil and Development Co., with headquarters at Maricopa, held its annual meeting on the 8th inst., and elected the following directors: J. H. Gaddie, L. F. Gaddie, E. L. Weed, W. J. Schultz, F. F. Weed. The officers are: President, F F. Weed; vice-president, W. J. Schultz; secretary and treasurer, E. L. Weed. The work of the company is hampered by the car shortage, and it cannot fill all its contracts. The company has ten flowing wells which produce 6,000 barrels monthly, and it has 30,000 barrels in reservoir.

Bakersfield, Cal.—The annual meeting of the Monarch Oil Co. was held Jan. 12th, and the following directors were elected: J. L. Depali, A. Burness, D. Burkhalter, L. V. Olcese and J. B. Hewitt. The company owns 160 acres of patented land in the Sunset oil district, and has one flowing well.

San Francisco, Cal.—Notice is given that at a meeting of the directors of the San Francisco Coke and Gas. Co., held on January 15th, a resolution was adopted calling a special meeting of the stockholders of the company to meet at the office of the company, 14 O'Farrell Street, on March 25th, to consider and vote upon the question of increasing the bonded indebtedness of said corporation from $2,500,000 to $7,500,000. President Leopold Michels of the company says that the directors recommended such action to enable the company to extend its mains, the gas plant, and also to install a plant to manufacture and furnish electricity throughout San Francisco. He also said that the proposed increase in the capital stock of the company and its bonded indebtedness had no connection with the merger contemplated or under negotiation by other companies, and that his company had no connection with any proposed merger.

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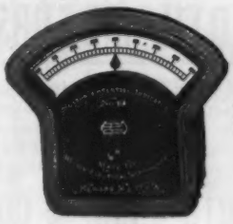

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RAILWAY NOTES.

Laurel, Mont.—The N. P. Ry. Co. will build a disinfecting plant here.

Portland, Ore.—Not only will the Harriman railroads be extended from Portland to Puget Sound, but they will invade western Washington and the Olympic peninsula. Preparations are being made to construct branch lines to Gray's Harbor and Willapa Harbor, and terminal facilities are being secured at those points.

Seattle, Wash.—The board of directors of the N. P. Ry. have authorized extensive improvements upon the lines in the State during the present year. Upon the main line between this place and Spokane a total of 120 track miles of new steel rails will be laid. On nearly all the branch lines new 72-pound rails will be substituted for the old trackage.

Seattle, Wash.—Final plans for the building of a standard-gauge railroad from the southwestern coast of Alaska to the gold and copper mines of the interior will be announced in New York from the headquarters of the Guggenheim and Morgan interests. Wharves have been built at Cordova, grading work finished for 20 miles and definite surveys made for another 200 miles.

Spokane, Wash.—The contract for the grading and construction of the Northwestern railroad, an extension of the O. S. L., from Huntington, Ore., to Lewiston, Ida., has been awarded to the Utah Construction Co.

Spokane Traction—Fifteen coaches of the Detroit type have been ordered by this company, at St. Louis, for March delivery. The cars will be 41 feet in length and will accommodate 125 passengers. They are equipped with four motors of 40 horsepower each.

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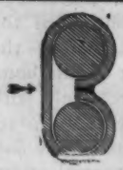

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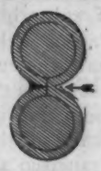

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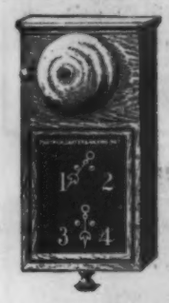

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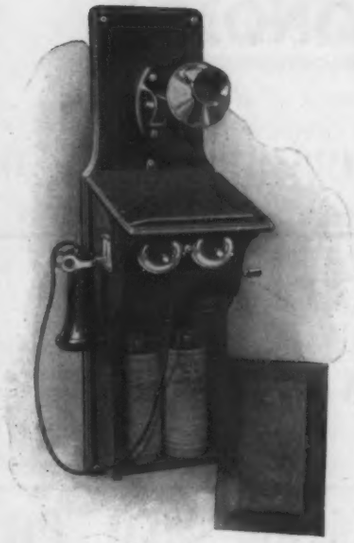

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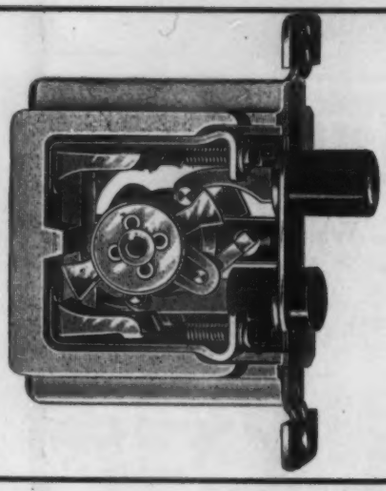

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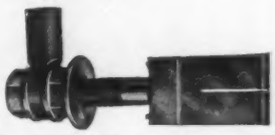

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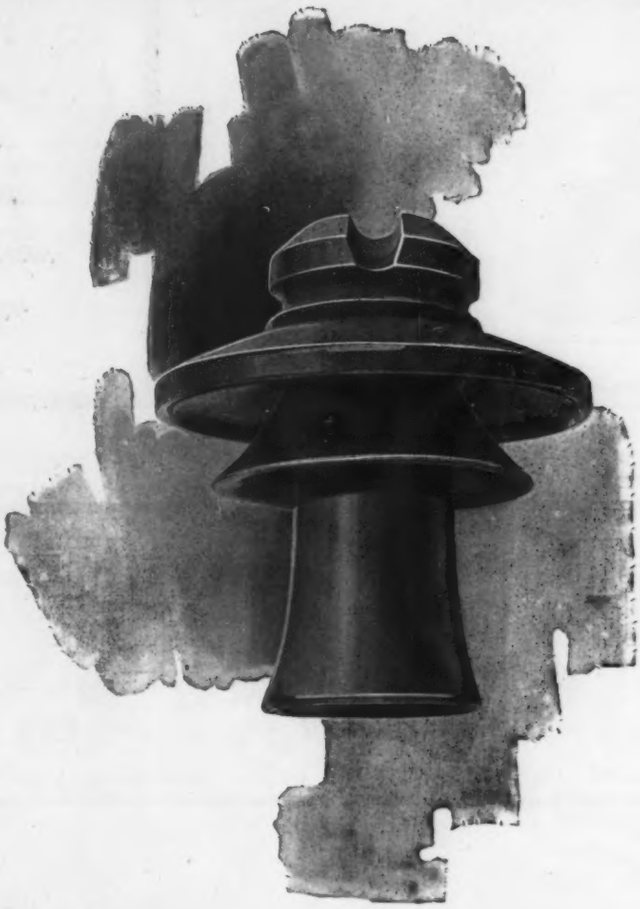

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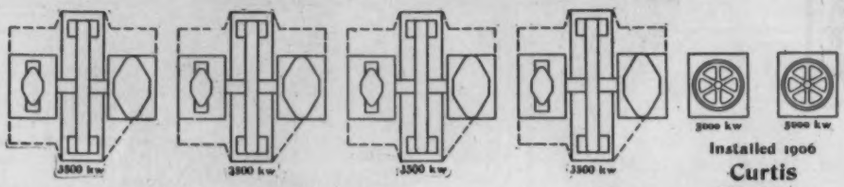

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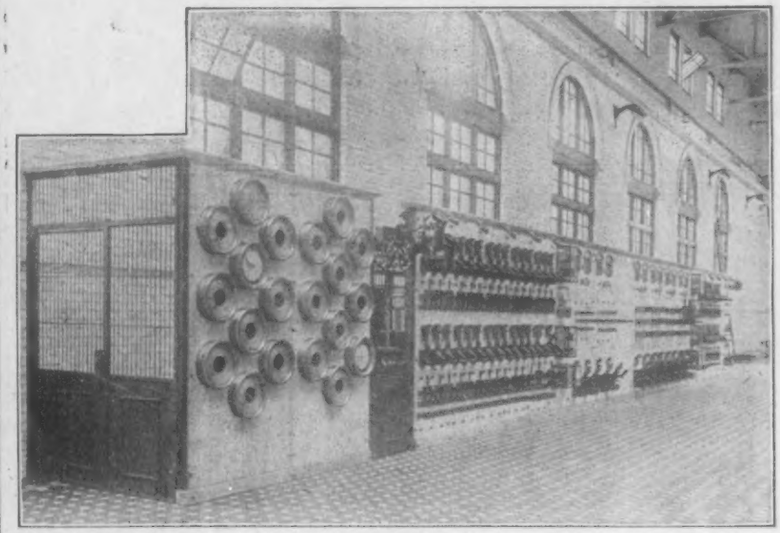

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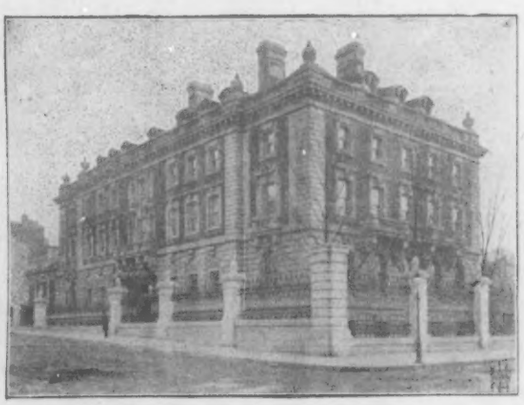

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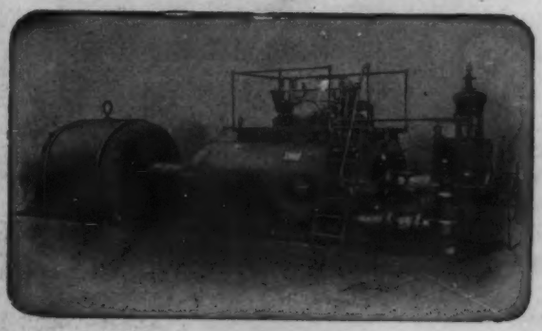

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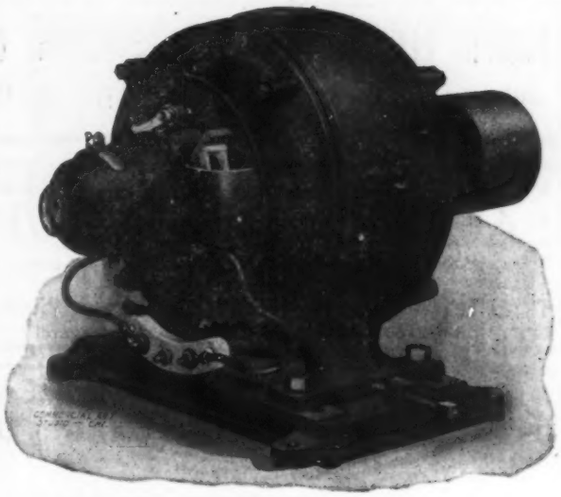

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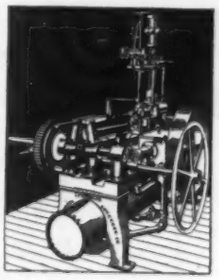

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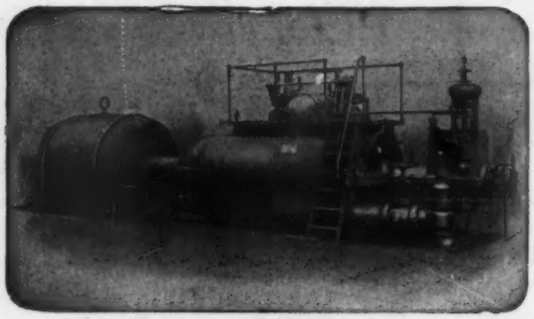

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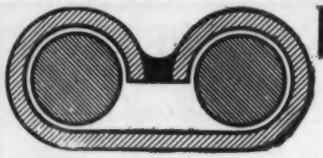

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OIL.

Martinez, Cal.—Oil has been struck at the Bull's Head Oil Works, but the extent of the flow cannot yet be determined. For some time a well-boring machine has been at work at the Bull's Head under the direction of J. R. Van Gant. While nothing definite could be learned as to the purposes of the company, it was generally presumed that its object was to learn if any indications of oil existed in that locality. The well is down over 800 feet, and at present is being cleaned out to make a clear passageway for the oil.

Bakersfield, Cal.—That the standard pipe line to the West Side is to be realized is now established almost beyond a doubt. A surveying party, headed by a right-of-way agent, County Surveyor Buffington, Cliff Greely, George Borgwardt and several others, traveling in two teams, have begun setting stakes from the point where the tide-water pipe line joins the Southern Pacific tracks, one and one-half miles north of Oil Junction. The line taken by the surveyors is southwest, toward the West Side.

Coalinga, Cal.—The heavy rains of last week caused a lot of trouble with the Associated pipe line to Monterey. The line is broken in three places between Coalinga and Alcalde, and at various places above that point. It will take several days to repair the damage, and in the meantime no Associated oil is being moved.

Fresno.—Since the California Oil Fields Co., Ltd., recently acquired control of the eastern side of the oil district the situation has become more acute. This condition was brought about by the Associated, which contracted with the California Oil Field Co. to purchase 1,500,000 barrels of oil at an advance of 30 cents. The exact price in the opinion of the independents is 35 cents, though this figure has never been authoritatively confirmed, owing to the secrecy which governed the transaction. This contract calls for the delivery of not less than 4,000 barrels daily. All the independent producers, not under contract, formed an organization six weeks ago for the purpose of obtaining a higher price for their oil. At the time the independents formed, the price of oil was 19 cents on contract and 17½ cents on daily runs. Since then the purchasing companies have offered to take the oil on daily runs at 25 cents, and the Associated has offered to purchase the fuel oil product for 1907, on contract, at 27½ cents. The independents refused the offers and have every reason to believe that they will be paid their price—30 cents—because they control half of the product in the West Side field. The California Oil Fields Co., Ltd., is delivering 4,000 barrels daily to the Associated, but its output is 15,000 barrels a day.

WATER WORKS.

Redding, Cal.—The water that will be furnished to consumers in Redding through the new system to be installed by the Redding Water Co. will be pumped direct from the wells, and not from the river as is the present method. These wells will be dug on the property just purchased by the Redding Water Co.

Sacramento, Cal.—At the meeting of the Board of Trustees the specifications for the water mains on I street, to cost $27,000, were adopted.

Yuba City, Cal.—C. B. Andros, the new owner of the Yuba City water works, is having surveys made through the Cooper tract for the purpose of extending water mains to that part of the city. The capacity of the tanks will be enlarged and other improvements made to meet the increased patronage in the various additions of the town.

Los Angeles, Cal.—Sealed proposals are being received at the office of the treasurer, Pacific Branch, N. H. D. V. S., Soldiers' Home, Los Angeles county, for furnishing and installing a water pumping plant, in accordance with plans and specifications.

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ILLUMINATION.

San Francisco, Cal.—Fire destroyed the Rio Vista Light & Power Plant at Rio Vista a few days ago, causing a loss of $10,000.

Los Angeles, Cal.—An ordinance has been adopted by the city providing for lighting Broadway from Temple to Main, for one year.

Los Angeles, Cal.—Authentic reports are to the effect that a corterie of capitalists is negotiating for a controlling interest in the Lowe or People's Gas Light & Coke Co., and that Prof. Lowe, the owner, is taking kindly to the plan. Reports concerning the formation of another company are rather vague, but in certain quarters it is declared that a third company is being formed. Dr. John R. Haynes is mentioned as one of the capitalists, but denies knowledge of the scheme. Reports have it that the new interests plan for a large capitalization so that mains can be extended and plants of the Lowe type of gas manufacture be erected for 500,000 consumers. Plans of the Los Angeles Gas & Electric Co. provide for expenditure of a large amount of money for increasing capacity of their present plant.

Anaheim, Cal.—Geo. M. Ross, of the local gas company, has made application for the establishing of a gas plant at Fullerton, which the city trustees have agreed to advertise. Mr. Ross is backed by local capital, and if he secures the franchise, he will install the plant at Fullerton without delay.

Kelseyville, Cal.—An ordinance has been passed by the Board of Supervisors granting the Lake County Electric Power Co. a franchise for erecting and maintaining a wire line for the transmission of electric power along certain streets and public highways in the County of Lake, for the purpose of supplying heat, power and light.

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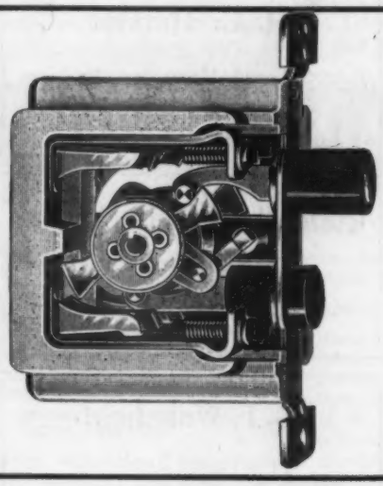

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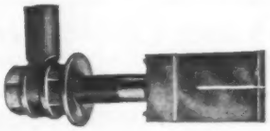

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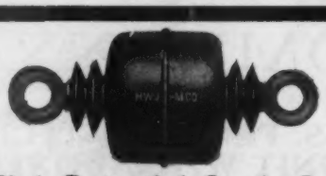

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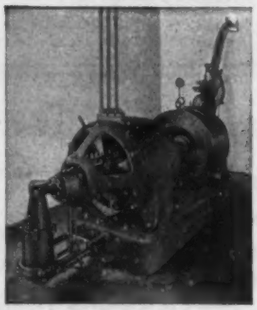

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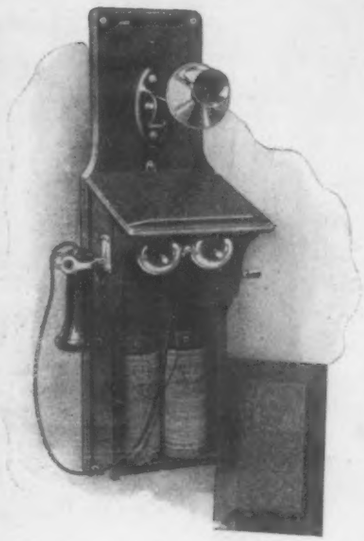

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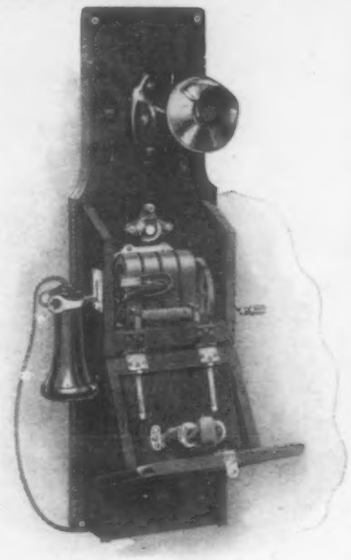

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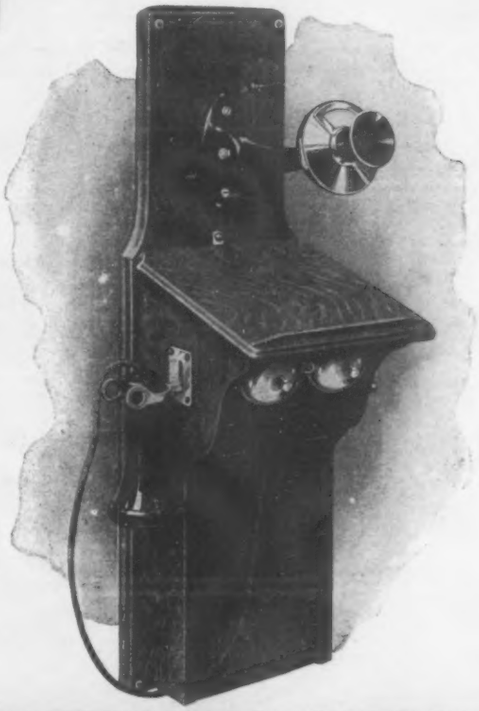

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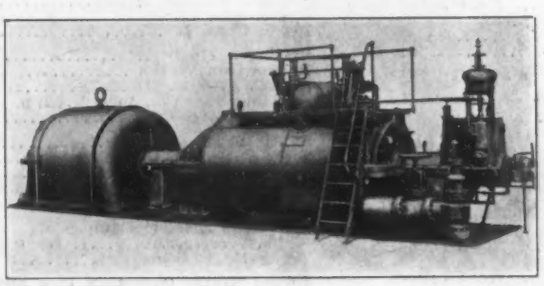

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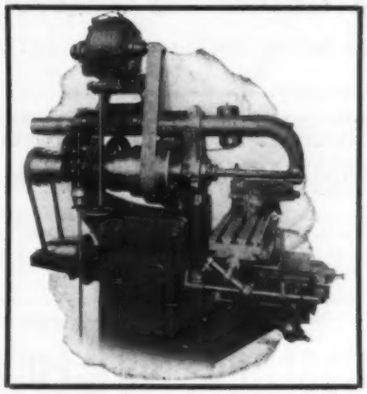

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TRANSPORTATION.

Los Angeles, Cal.—Sealed bids will be received by the board of county supervisors up to 2 p. m. of March 4th for an electric railroad upon certain streets in the county of Los Angeles. Each bid must be accompanied by certified check for the full amount of the bid. Beginning at the intersection of the westerly boundary of Los Angeles with Pico street, running westerly along Pico a distance of 9000 feet.

Los Angeles, Cal.—Sealed bids will be received by the board of supervisors of Los Angeles county until 2 o'clock p. m. of March 4 for a franchise to contract and operate an electric railroad over, along and upon certain public highways, beginning at Third and Vermont on Fourth and Western to Melrose.

City of Mexico, Mex.—Robert C. Brown, managing director of the Mexico Electric Tramways, is here to ask permission from the government for the extension of the street railway system of the Federal district.

San Francisco, Cal.—President George A. Newall of the Presidio and Ferries Railroad Co., told the judiciary committee of the supervisors a few days ago that the Union street line would be ready to run cars on the stretch between Steiner and Polk streets at once, and asked three months' extension to complete the entire road. Chief Engineer Holmes said the western end could and would be constructed within sixty days. The matter will be decided on February 7th.

Los Angeles, Cal.—At the last meeting of the city trustees the Interurban Railway Co. was given a franchise to run a branch line up the alley west of Glendale avenue from Fourth street to Third street, where they will strike another street between G and H streets which they can follow up to Second, thence back to the alley leading to First.

Fullerton, Cal.—Surveyors have been busy at work this week setting stakes from this point southwest to Huntington Beach for the electric railroad.

Huntington Beach, Cal.—A right of way is being surveyed by former County Surveyor S. H. Finley for an electric railroad between Huntington Beach and Santa Ana. It will be built by the Huntington Beach Co.

Merced, Cal.—O. W. Lehmer, superintendent and traffic manager of the Yosemite Valley railroad, with headquarters in this city, states that in his opinion the new line will handle 50,000 people from March 15th of this year to March 15th of next year. He said: "All the grading is completed, with the exception of four miles, and we are confident that we shall have the line ready for operation by March 15th. We believe that we will carry 50,000 people into the valley in the twelve months following. Our road will take the passenger five miles from the Cascades and 12 miles from the Sentinel hotel. There are 1100 men employed on the grades. The road will be built solidly with steel rails, steel bridges and rock ballasted. There are already several mines being opened up along the route and we expect to do a big freight as well as passenger business. One 40-stamp mill is in operation, and two additional mills, one of 40 stamps and one of 100 stamps, are to be installed. The company, furthermore, is planning to construct a wagon bridge at Horseshoe Bend, at the completion of which it will haul all the freight for Coultersville, Big Ock Flat, and as far in as Groveland. It is expected also to carry, during the coming season, the entire tourist travel delivered by both the Southern Pacific and Santa Fe.

San Leandro, Cal.—At a special meeting of the trustees the Oakland Traction Consolidated was granted a franchise to construct a double line to Haywards. In return the company makes concessions as to schedules and fares. The railroad is to run its double tracks to the town limits on the east. It is to bear its portion of expense in repairing the street, and has further agreed to honor San Leandro-Oakland commutation tickets on Sunday. Cars are to be run on a ten-minute headway.

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Sacramento, Cal.—J. C. Carly, of the Hawk, Hawley & Carly Co., says that he has signed up an agreement with the Sacramento Gas and Electric Co. for the immediate construction of an extension of the electric road from Highland Park to Curtis Oaks, the new subdivision, through Curtis Oaks to Oak Grove, and thence to the entrance of Oak Park. Mr. Carly says that the arrangement insures a 15-minute service from the Southern Pacific passenger depot.

Colusa, Cal.—Captain W. T. Forsman, who was granted an electric railroad franchise in this county by the supervisors May 2, 1905, started a surveying crew out January 16th in charge of Engineer J. W. Kaerth. This survey is for taking elevations and setting stakes preparatory to the commencing of grading.

WATERWORKS.

San Francisco, Cal.—The Spring Valley Water Co. has perfected plans for a high-pressure water supply for the Western addition. Chief Engineer Herman Schussler has placed an order for 12,000 feet of force pipe to be used in the extension and has decided to place a supplementary pumping plant near Lake Merced.

San Diego, Cal.—The Homeland Improvement Co. will construct a pumping plant at Rose creek at the spot where the city water company contemplated obtaining the San Diego water supply. The water will be piped to a reservoir on the top of the promontory and hillside residences will be supplied with water.

San Diego, Cal.—The South Coast Land Co., which is to supply Oceanside with water, has struck a good supply at the Jones orchard, four miles above Oceanside, on the San Luis Rey river. A 50-horsepower engine and pumping plant will be installed as soon as possible.

San Francisco, Cal.—Engineer Marsdon Manson filed a denial with the supervisors yesterday that he had ever approved of the American-Cosumnes rivers' water supply scheme for the city, as advanced by the Bay Cities Water Co., and cited excerpts from his reports showing adverse criticisms he has made upon the proposal. Among the drawbacks to the proposition Manson alleges that 27 of the 147 square miles of the Cosumnes watershed is privately held, partly inhabited, towns and summer resorts being scattered over it, rendering its water impure.

OIL.

Los Angeles, Cal.—The board of supervisors has ordered the advertisement of franchise for an oil pipe line franchise on Wilshire boulevard.

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POWER AND LIGHT PLANTS.

Delta, Ida.—Hill Bros. are planning to build an electric power plant at Carbon Center.

Entiat, Wash.—The electric light plant will be enlarged at once. Mr. Gray, supt.

Missoua, Mont.—The work of installing two additional 150-horsepower boilers to complete the heating and electric power plant of the Missoula Light & Water Company, near the Higgins avenue bridge, has been begun under the direction of G. W. McEwen of Cleveland.

Missoula, Mont.—J. A. Jones, mgr. of the Missoula Gas Co., announced that a site had been purchased for the gas plant and work will be commenced at once. The main building will be of concrete blocks, 38x80 feet ground dimensions. The plant will have a capacity of 120,000 cubic feet per day.

Nelson, B. C.—The West Kootenay Power Co. is installing an addition to its plant which will bring its capacity up to 36,000 h. p.

Pasco, Wash.—W. H. Moser & Co. have secured the contract for building the power station of the Pasco Light & Power Co.

Spokane—A power plant which will be the largest in the west is to be built at Z falls on the Pend d'Oreille river. The water rights and power sites are owned by David T. Ham, Wilbur S. Yearsley and Edgar A. Torrence of this city. 35,000 h. p. will be developed.

Tacoma—It is reported that H. E. Salsich will build a large power plant on the Nisqually river.

Redding, Cal.—The Northern Electric & Power Co. has secured the right to 4000 inches of water taken from the Old Cow creek, South Cow creek, and Hill creek. Two power plants will be built both on the South Cow creek, five miles apart.

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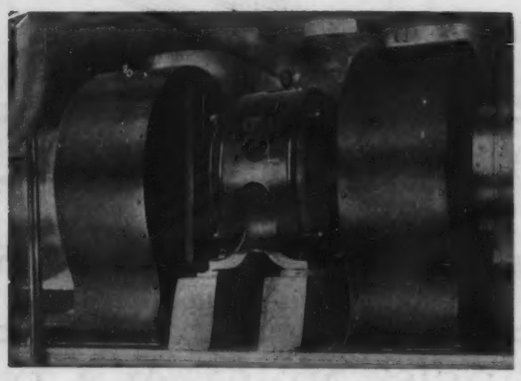

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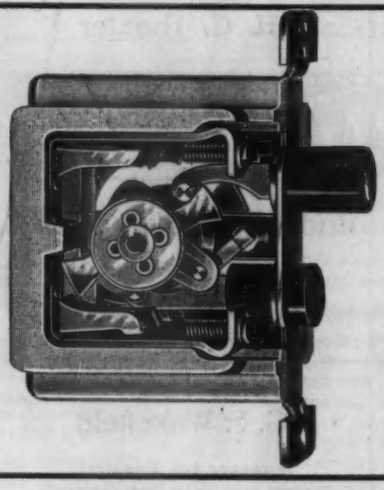

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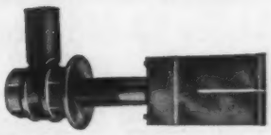

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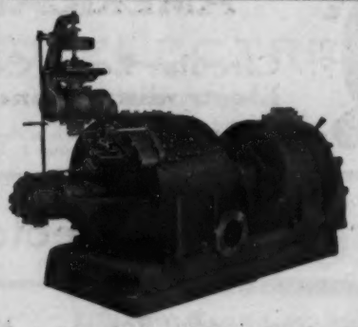

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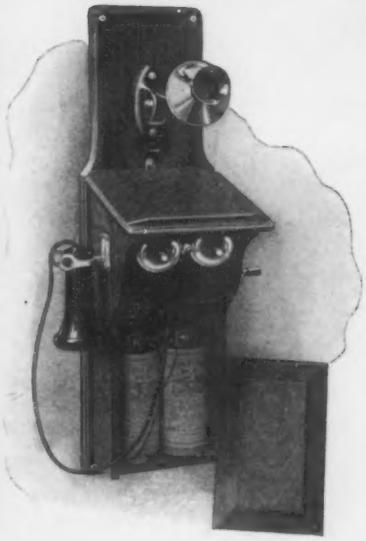

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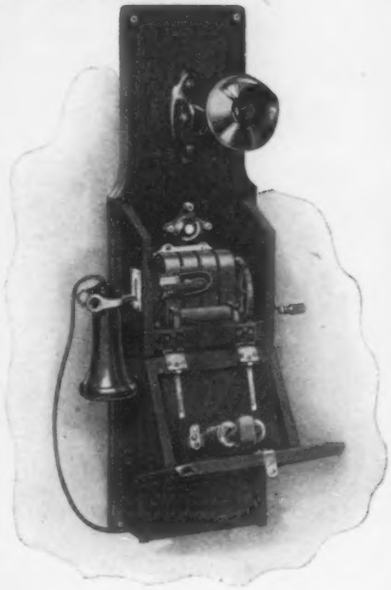

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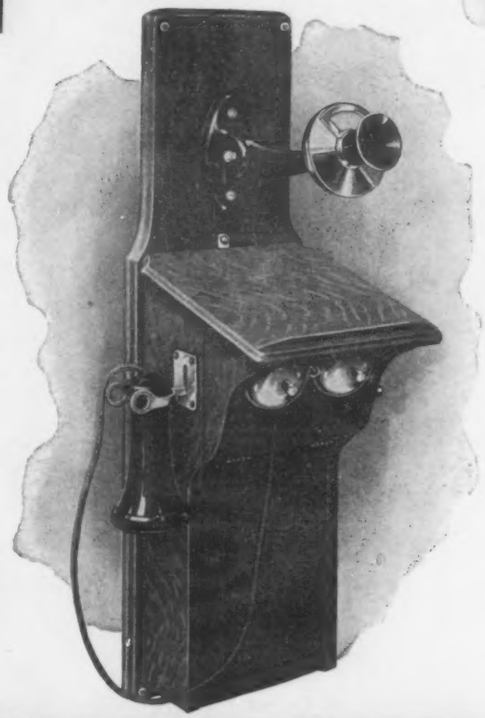

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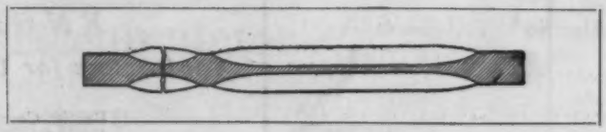

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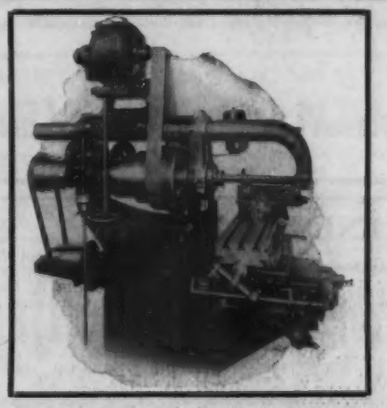

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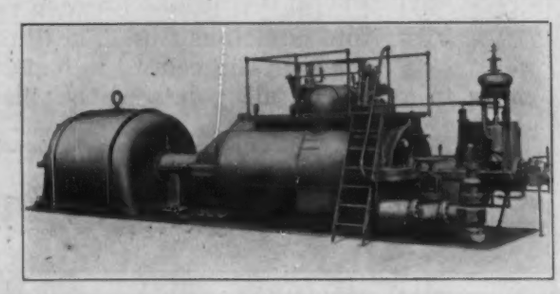

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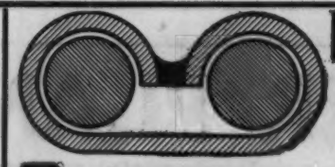

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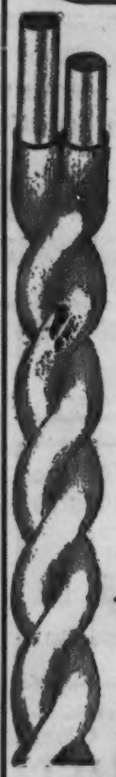

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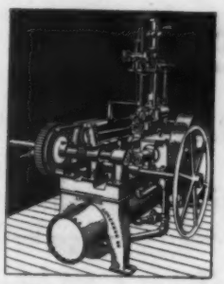

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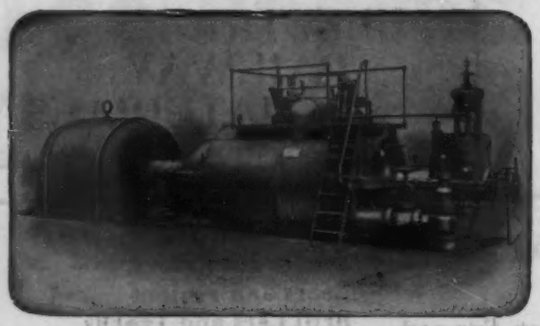

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TRANSPORTATION.

Oakland, Cal.—The Key Route company has started the work of constrcuting the new harbor basin on the waterfront south of its present trestle, and the work will, from this time forward, be pushed rapidly. A large dredger arrived on the scene Monday and was stationed at the foot of B street. It will go to work at once dredging out the space lying between the tracks of the Key Route and the Southern Pacific mole. It is thought that in making a channel to the wharves, which will be built along the sides of this basin to a depth of 30 feet, sufficient material will be secured to fill in the 500 acres of land owned by the company along the north side of the basin. The amount of material to be dredged to give the channel a uniform depth of 30 feet will be 5,000,000 cubic yards, and this amount will cover the filled land to a depth requisite for its usage. This filled land will be utilized for sites for railroad terminals and for manufactories. A track will be extended from the wharves which abut on this filled ground to the proposed line of the company on Wood street, which will give the company an outlet in that direction and will give it further connections with such railroad lines which may be seeking the waterfront for terminal facilities. The work of dredging out the channel and the construction of the new wharves, which will give accommodations for fully 200 vessels of the largest size, will be under the supervision of Howard Holmes, the well-known engineer.

Oakland, Cal.—The Southern Pacific Co. has closed the purchase of an entire block lying west of Fruitvale avenue, the consideration being $30,000. The property was purchased by the railroad company as a site for the new power-house and car-barns which the company will erect in connection with the establishment of an electric line to supersede the steam roads which now accommodate the local travel in this city and Alameda. The company proposes to erect one immense power plant at this point for the generation of the electric current for the entire new system. This will require an outlay of half a million dollars.

San Francisco, Cal.—The completion of the entire Union-street line within nine months, of that section of the road between Steiner street and the Presidio within ninety days, and the deposit of a $50,000 bond for the full accomplishment of the foregoing conditions within the given time, were the requirements forced on President George A. Newhall of the Presidio and Ferries Railroad Co. by the Supervisors' judiciary committee. Newhall and his attorney, Lilienthal, objected to the shortness of time more than the requirements for a bond, asking two years for final completion of the electrization of the road. This, however, was denied them, and while not agreeing downright to the giving of a bond, Mr. Newhall made arrangements for Lilienthal to consult with City Attorney Burke concerning its conditions.

Oroville, Cal.—Much progress is being made at Big Bend on the work of erecting the great power plant for the Western Power Company. The thousands of barrels of cement necessary to line the walls of the tunnel will begin to arrive in a few days, and many more men will then be put to work. At the present time there are about 600 men employed.

Santa Rosa, Cal.—The council has passed an ordinance granting to the Pacific Gas & Electric Company the right of using the streets and alleys for the purpose of transmitting, conducting and distributing electric current to be sold and used for heat and power purposes, electric transmission lines and other conductors, appliances and apparatus.

Oakland—Sealed proposals will be received up to February 28th, for the installation of electrical work at the United States Immigration Station on Angel Island. Further information obtained on application to the office of Walter J. Mathews, 969 Broadway, Oakland.

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TRANSMISSION.

San Francisco—F. G. Baum, one of the directors of the California-Nevada Electric Power Company, with offices in the Chronicle building, says: "The California-Nevada Electric Power Co. has been organized to develop power on the eastern slope of the Sierra Nevada Mountains, where it controls no less than 50,000 horsepower, and this can probably be increased to 100,000 if there is a demand for the power. The company has been working on the projects for some time, and had several field parties out last summer getting the engineering information necessary before proceeding with the active construction. It is the intention to supply power to the entire Central Nevada and the eastern side of California."

Stockton—The combination and exchange of power that has been carried on by the Stockton Gas and Electric Co. and the American River Power Co. has ceased to exist, and hereafter the American River Co. will not be given any current in case of a breakdown. This is said to be one of the reasons why there is such a rush to get the auxiliary plant on Mormon channel in operation. The plant was to have been built this year anyway, but the rupture between the two companies made it necessary to get it in working order at the earliest possible date. According to reports the trouble between the two companies was caused by some of the directors of the American River Co. organizing a light company in San Francisco in opposition to the Standard and Bay Counties Power Co.

Watsonville—Owing to the difficulty experienced in securing manufactured stock, the Pajaro Valley Mercantile Co. has decided to engage in the business of manufacturing chandeliers, etc., and has purchased the electrical business of Mudgett & Grant on Third street.

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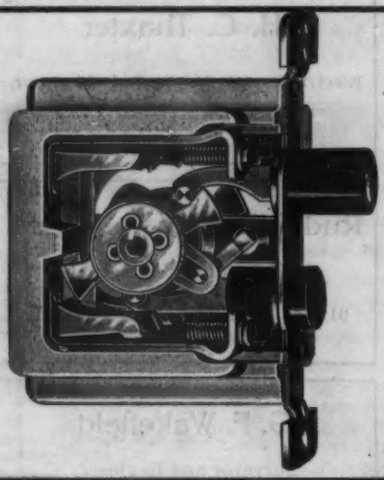

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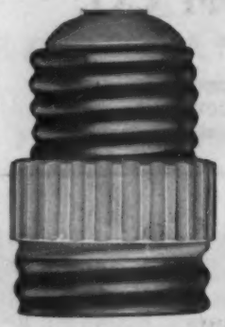

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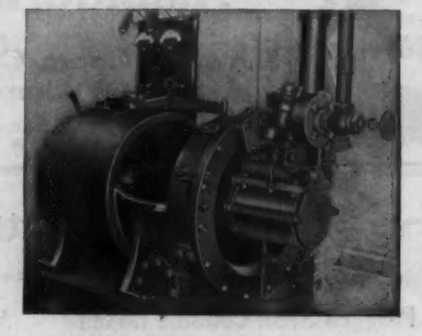

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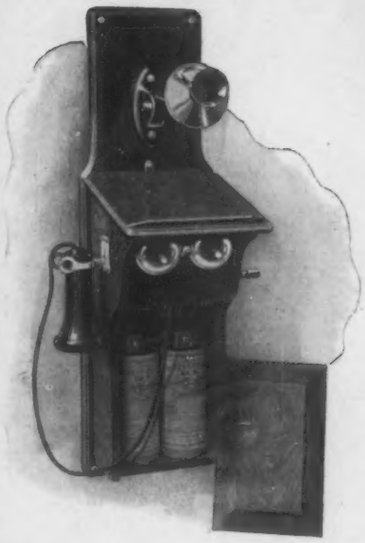

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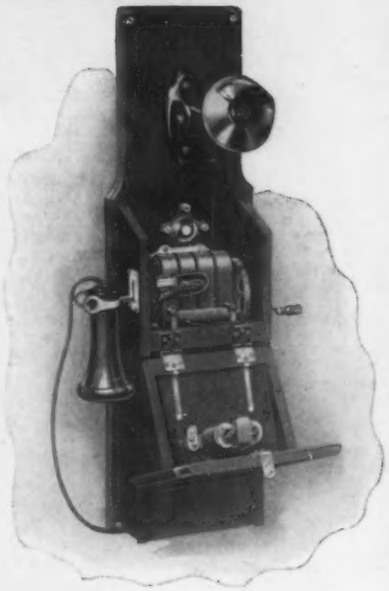

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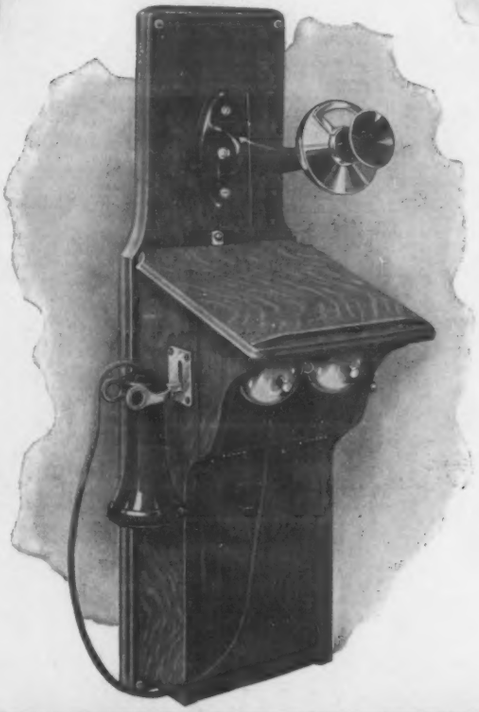

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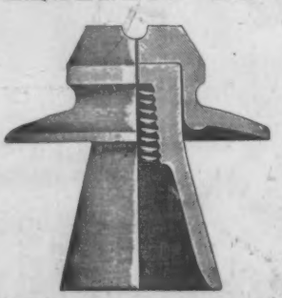

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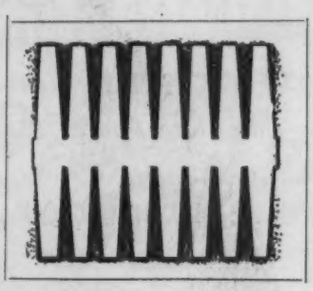

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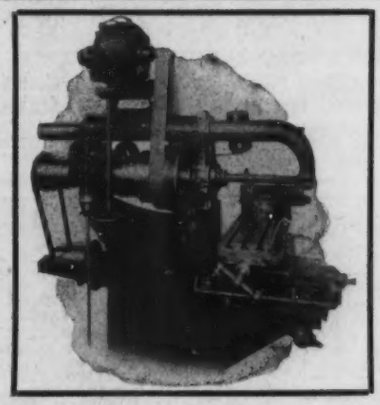

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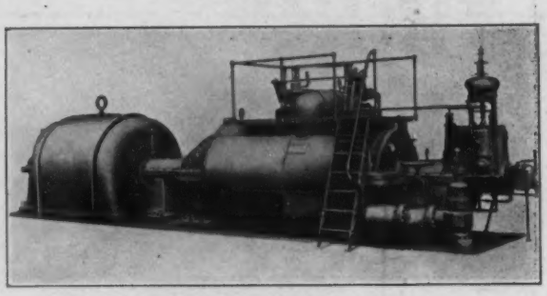

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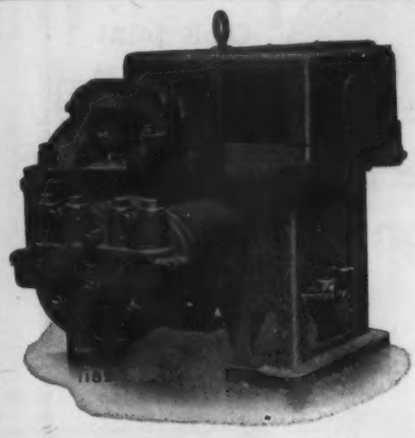

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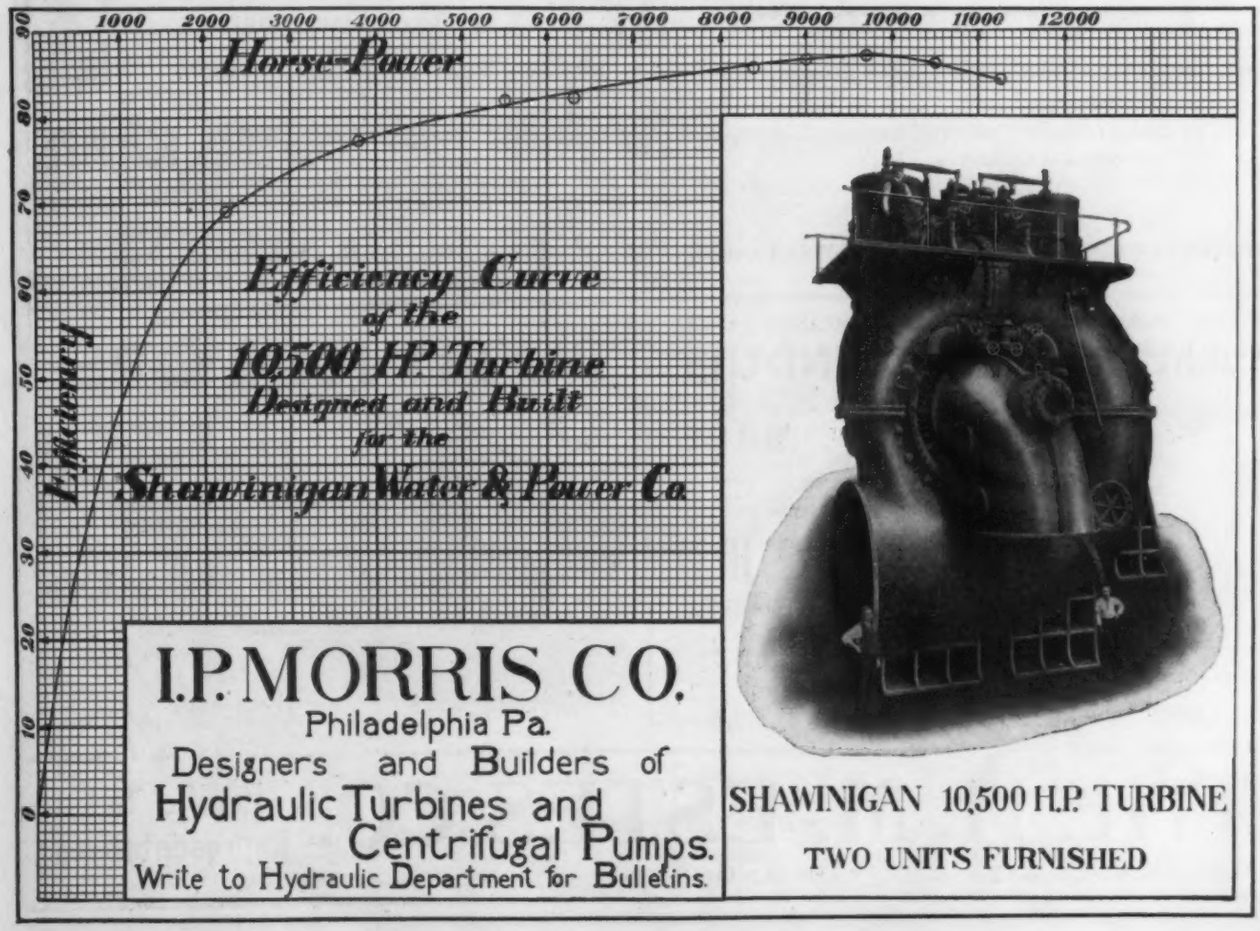

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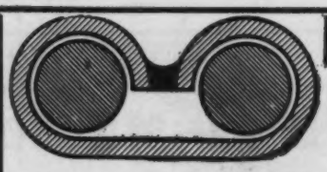

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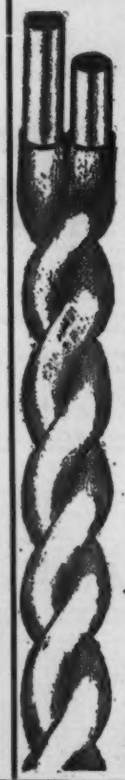

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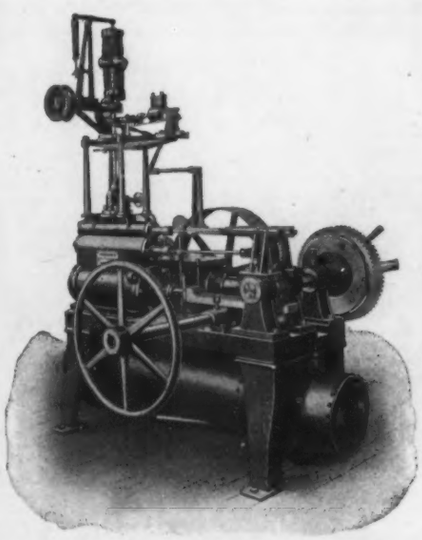

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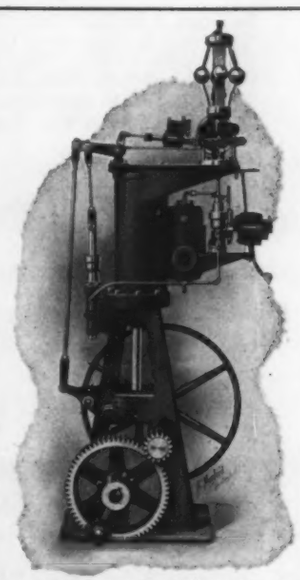

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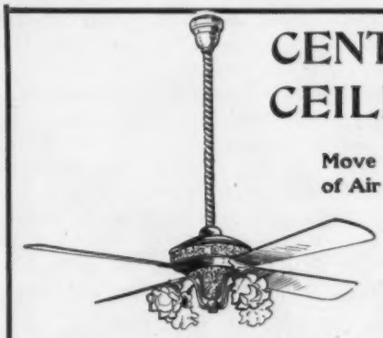
WATER WORKS.

San Francisco, Cal.—The Board of Supervisors has begun its investigation of the properties and general finances of the Spring Valley Water Co. for the purpose of establishing a basis upon which to determine and to fix the water rates to be charged to the city during the fiscal year beginning July 1, 1907. Little progress was made, owing to the fact that the Board had not received the report of City Engineer T. P. Woodward, appraising the Spring Valley's properties, and that the company was not able to furnish its own inventory of properties, which, it was announced by its representatives, it would not be able to furnish before next Wednesday. According to Woodward's report, he places the value of the whole peninsula system of the Spring Valley at $9,743,749; of the Alameda Creek system at $5,265,010; of the city distributing system at $6,654,590; of miscellaneous properties at $200,500—making a grand total valuation by the City Engineer of $24,569,828, which allows for damage and for betterments made last year.

San Francisco, Cal.—The election of Capt. A. H. Payson to succeed E. E. Calvin in the presidency of the newly organized Northwestern Pacific Railroad, was followed by the announcement that the former will retire shortly from the presidency of the Spring Valley Water Co.

Los Angeles, Cal.—The Western Gas Engine Co. of Los Angeles has secured the contract for installing and furnishing a pumping plant near the northern limit of the grounds of the Soldiers' Home. The price is $1,200. Another contract was let to Charles Parcels of Sawtelle for the sinking of a 12-inch well for the development of water. The location is about a half of a mile east of the powerhouse. The contract price is $950.

Capitan, N. M.—The Alamogordo Improvement Co. has sold its interests at the new division point, Carrizozo, to a new company of California people, with I. O. Wetmore as trustee. Considerable money will be spent on parks, buildings, streets, etc. Another company has been formed to pipe water from the mountains to the new town.



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ILLUMINATION.

Healdsburg, Cal.—Representatives of G. W. Wickersham of San Francisco have appeared before the board of trustees and asked for the privilege of installing a gas plant in the city of Healdsburg for heating and cooking purposes.

San Francisco, Cal.—In order to secure the improvement of Fillmore street and to enable the city to begin work of repaving and installing a new lighting system of that street without further delay, the members of the Fillmore Street Improvement Association have subscribed to nearly $50,000 worth of city bonds.

Los Angeles, Cal.—The city council has opened bids for steel poles, pole steps and bolts, cedar poles, cross-arms and wire, and awarded contract to B. F. Kierulf, Jr., & Co., of Los Angeles, as follows: Steel poles, pole steps and bolts, $3,250; cedar poles, $10,975; cross-arms, $1,275; wire, $19,431.84.

Eureka, Cal.—Contracts have been awarded by the board of directors of the Eureka Lighting Company to Langford Bros., local contractors, for the erection of a new gas plant at the foot of Whipple street, to cost in the neighborhood of $40,000, and Superintendent T. D. Perch of the same company is in San Francisco, where he will make arrangements for the purchase of new machinery and equipments for the gas plant.

Anaheim, Cal.—Sealed proposals are being received by the board of trustees, at the office of the city clerk, for furnishing the city forty series alternating current enclosed arc lamps, with base enclosing globes of opalescent glass; to have black japanned body; lamps to be rated 5.6 amperes and to use ½x12-inch carbons. Plans are now one file with the clerk.

Anaheim, Cal.—Sealed proposals for the construction of a Municipal Light and Water Works building are being received by the board of trustees in accordance with plans on file with the clerk and in the office of Copeland and Seganck, mechanical engineers, National Bank building, Los Angeles.

Mill Valley, Cal.—The San Rafael Gas & Electric Co. has completed arrangements to install an auxiliary substation at Alta for the benefit of Mill Valley and Sausalito. A contract has been entered into with the North Shore Railroad by which the electric company secures a portion of the railroad's power house at that point for its new substation.

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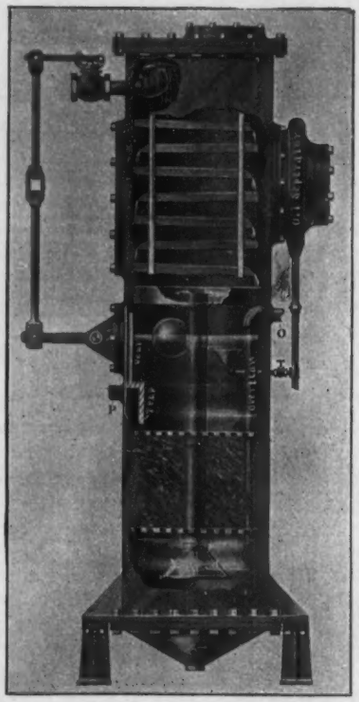

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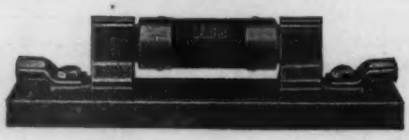

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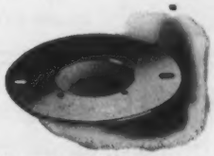

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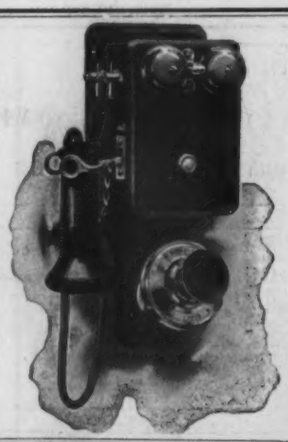

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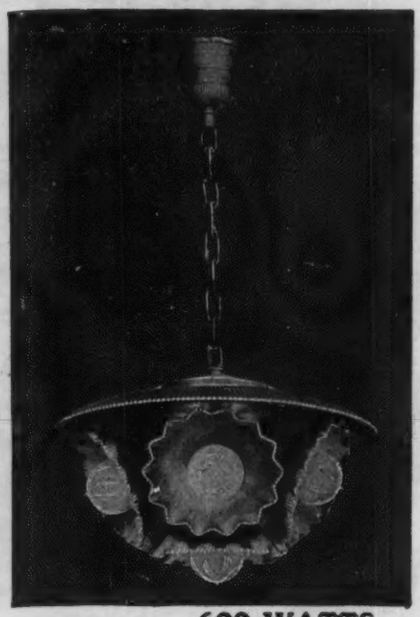

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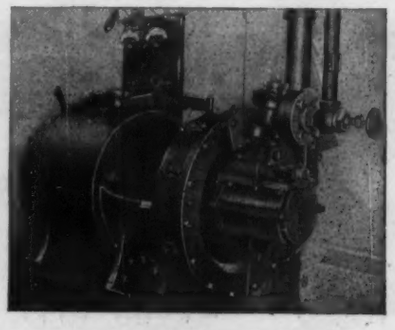

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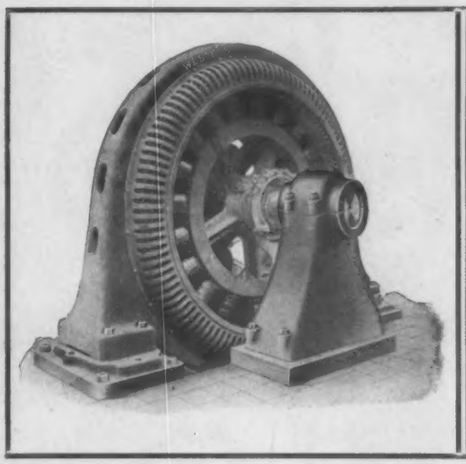

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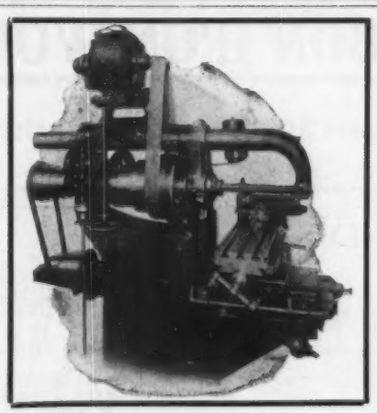

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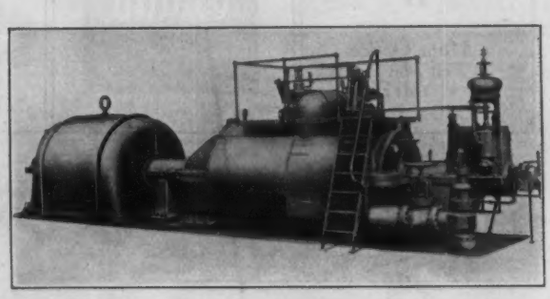

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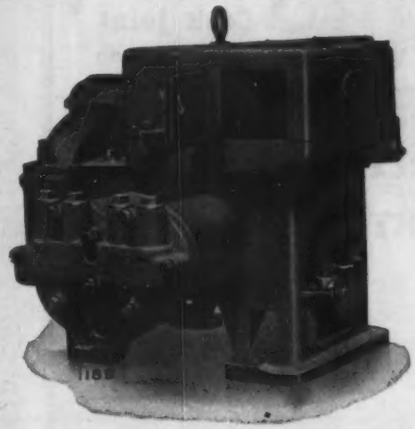

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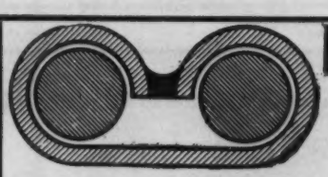

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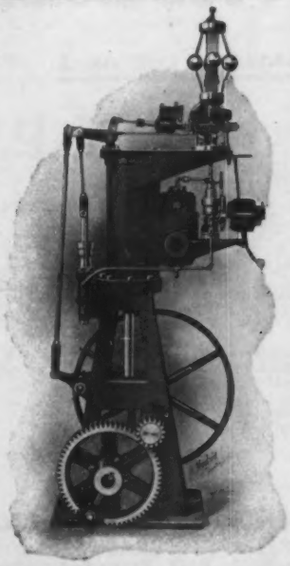

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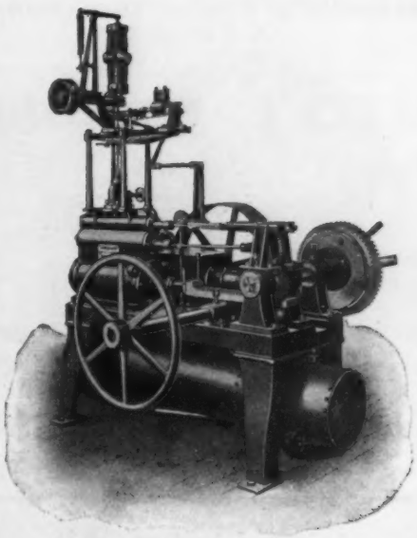

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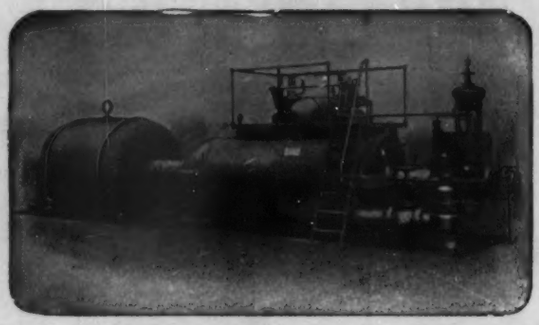

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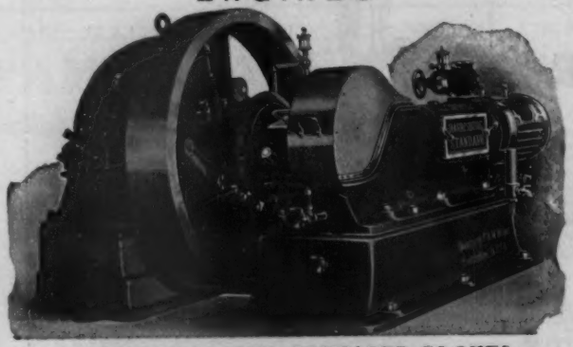

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FROM A SATISFIED CUSTOMER

Western Fuel Company

SAN FRANCISCO, CAL., February 1, 1907

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Main and Folsom Sts., San Francisco, Cal.:

DEAR SIRS:—The 200 H. P. Parker Boiler installed by you at our power plant is fully meeting your promises and our expectations.

At the end of three months' continuous operation it was found that the tubes were entirely free from scale, as the latter had been carried into the drum from which it was readily removed.

Its use shows a distinct economy in the amount of coal used as compared with the consumption of the other boilers in doing the same amount of work, and with no apparent ill effects it has on many occasions responded to the call for additional work to meet exigencies. We are highly satisfied with it.

Very respectfully, WESTERN FUEL COMPANY
[Signed] John L. Howard, President

SECURES GREATER ABSORPTION OF HEAT AND CONSEQUENT ECONOMY

NO WET STEAM BURNT TUBES LEAKING

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KEYSTONE BOILER WORKS Main and Folsom Sts. San Francisco, Cal.

ENGINEERING.

Spokane, Wash.—The Hayden-Coeur d'Alene Irrigation Co., capital $150,000, has been incorporated by William C. Malloy, John S. Malloy and H. P. Blanchard.

Arlington, Ore.—Manager J. A. Smith, of the Baker Irrigation Co., has commenced work on a large reservoir north of the city.

Astoria, Ore.—Preliminary work on the government jetty at the mouth of the Columbia River has been started by Colonel S. C. Roessler. A parallel trestle two and one-half miles in length is being built between Fort Stevens and the sands.

Blackfoot, Ida.—The Lost River Construction Co. has been awarded the contract by the Big Lost River Land & Irrigation Co. for the construction of the necessary irrigation works to reclaim 80,000 acres of the Carey land in the Lost River Valley.

Great Falls, Mont.—Bids are asked by the U. S. reclamation service until April 3 for constructing twelve miles of main canal, sixty-seven miles of laterals and seventeen miles of waste water ditches. The work consists of 481,000 cubic yards of excavation, 1,200 cubic yards of concrete, 20,000 B. M. of lumber, and placing 182,000 pounds of steel.

Milner, Ida.—Sealed proposals will be received at this office until March 12, 1907, for the excavation of four miles of canal containing about 93,000 cubic yards of lava rock excavation, 470,000 cubic yards of earth excavation, 32,000 cubic yards of puddle embankment, 4,500 cubic yards of concrete work, 8,000 cubic yards of loose rock excavation; also forty miles of small canals and laterals containing about 260,000 cubic yards of earth excavation. Twin Falls North Side Land & Water Co.; by Paul S. A. Bickel, chief engineer.

Boise, Idaho.—Work on the big north side irrigation project on the Twin Falls tract is to be begun the first week in March. It is stated that $2,500,000 will be expended on the project and at the rate of about $100,000 per month. The system is to be installed by the Twin Falls North Side Land & Water Company.

Seattle, Wash.—Major H. M. Chittenden stated that surveying parties are working on the Duwamish, Puyallup and White rivers in the preliminary labors introductory to the engineering operations, which they are expected to make for the prevention of floods.

Vancouver, B. C.—It is proposed to dredge Coal Harbor beyond the bridge to Stanley Park.

Victoria, B. C.—It is reported that the C. P. R. R. will dredge the mouth of Victoria harbor.

OIL.

Santa Cruz.—Col. E. J. Bean, after many months of negotiation, early in 1906 secured oil options on about 50,000 acres of land up the coast, including the Swiss ranches and others. The petroleum outcroppings on the Enright ranch, following the cut made by the Ocean Shore Railroad in grading, were so profuse that it has been decided at once to bore an experimental well on the upper Enright ranch. Mr. Enright has the contract to grade a road to the proposed well site.

San Luis Obispo, Cal.—The report comes from Orcutt that the Standard Oil Co. is buying oil only upon its existing contracts, taking no excess from any company. Its pipe line has a capacity of 25,000 barrels a day, but the company is taking only about 4,000 barrels a day from that field. Six of its eight oil tanks are empty, each of them having a capacity of 35,000 barrels, but it is expected better conditions will shortly prevail.

FOR GAS COMPRESSORS see RIX C. A. & D. Co., S.F.

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FINANCIAL.

San Francisco.—The new issue of Pacific Telephone and Telegraph first 5's were listed this week on the San Francisco Stock and Bond Exchange. The bonds issued and listed at this time amount to $3,000,000, dated January 2, 1907, due January 2, 1937, callable after January 1, 1922. The Pacific Telephone and Telegraph Co. has also issued $18,000,000 preferred and $18,000,000 common stock, of which the preferred represents cash invested in the property. This company now controls the entire Bell telephone system on the Pacific Coast, including the States of Washington, Oregon and California, with branches into British Columbia, Idaho, Nevada, and Arizona. Earnings for the calendar year 1907 are officially given as follows:

Gross revenue	$7,982,520
Op. expenses and maintenance	6,144,753
Net earnings	1,837,767
Interest	383,144
Surplus for dividends	1,464,623

The earnings for 1906 showed a decrease of about $300,000 as compared with 1905, on account of the conditions arising from the April fire in San Francisco, but as indicated they still show a large surplus after the payment of interest and of dividends on outstanding stock.

San Francisco.—The Monterey County Gas and Electric Co. has levied an assessment of $10 per share, delinquent March 16th, sale day April 9th.

Fresno.—The Kern Canon Oil Co. has levied an assessment of ½ cent per share, delinquent February 5th, sale day March 20th.

Visalia.—The Lindsay Heights Water Co. has levied an assessment of $2.50 per share, delinquent February 18th, sale day March 9th.

Cody, Wyo.—The secretary of the interior has awarded to the New Jersey Foundry & Machine Co., New York, the contract for furnishing high-pressure gates for Shoshone and Pathfinder Dams at $123,500.

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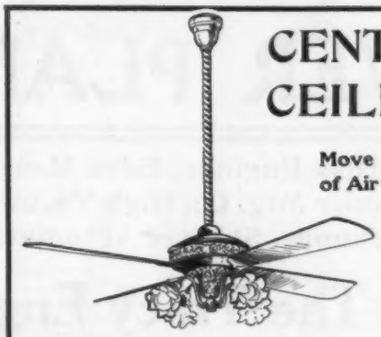
FINANCIAL.

San Francisco.—The companies supplying the city with gas and electric light have submitted statements to the Supervisors showing their receipts and expenditures, value of plants, outstanding stocks, bonds, etc., the net results for the year showing a loss, due to the fire. These filings will be taken up by the Board's meeting on Saturday to fix rates for the next year. The San Francisco Gas and Electric Co. stated its receipts for gas as $1,899,824.04; for electric light, $1,521,033.09; from other sources, $209,113.77. The "costs" were, respectively, $2,202,981.47 and $2,069,256.14, giving a "net loss" of $642,256.72. For the Coke and Gas Co. the revenue stated was $49,060.65, and the expenses $177,778.79. For the Mutual Electric Light Co., respectively, $71,281.42 and $53,396.97.

San Francisco.—T. G. Hart states that the sale has been completed of the Oil City Petroleum and Twenty-eight Oil Companies for $855,000, to W. M. Hall, supposed to represent the Standard Oil Co.

Eureka.—Annual reports of the different water companies of the county came before the Board of Supervisors last week. That of the Riverside Water Works, of Ferndale, showed that the plant is now worth $10,577.30. Last year the expenses were $300, and $889.20 were taken in, giving a profit of $580.20. Mrs. Ella Trumble, proprietor of the Hose Avenue Water System, situated near Fortuna, reported that for the year 1906 her receipts had been $294 and her expenses $99, the profit being $195. A petition was received from the Rio Dell Water Co., asking for a franchise to sell water, and lay pipe in the town of Rio Dell, in Humboldt County, and asking that the Board fix rates to be charged for said water. The petition was signed by Denver Sevier, A. A. Curtis, J. A. Sinclair, Ida H. Sevier, and C. H. Kinsey.



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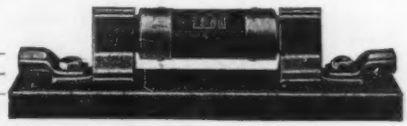

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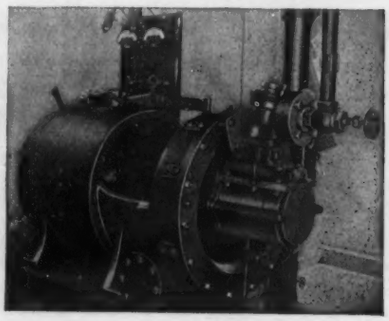

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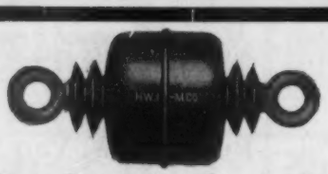

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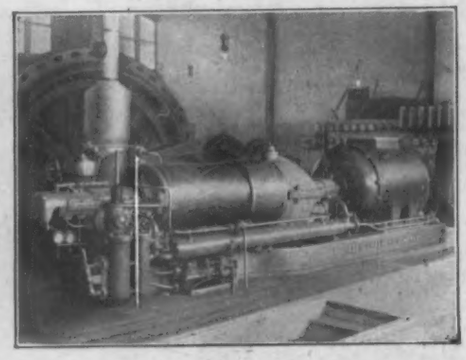

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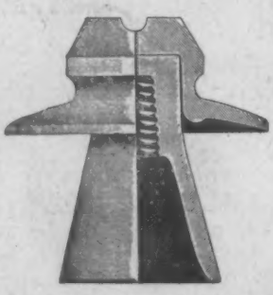

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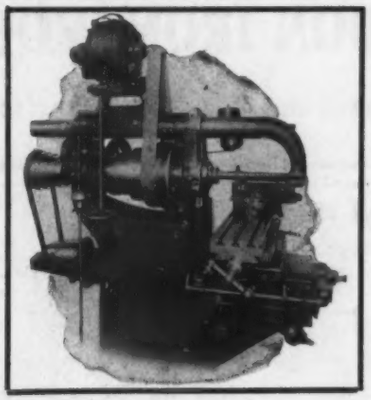

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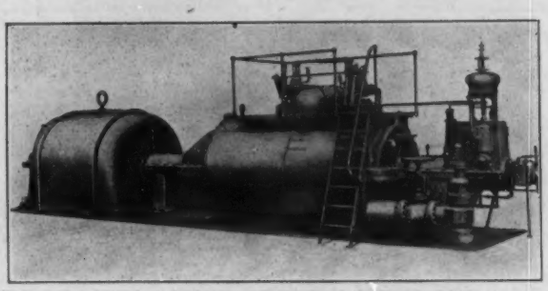

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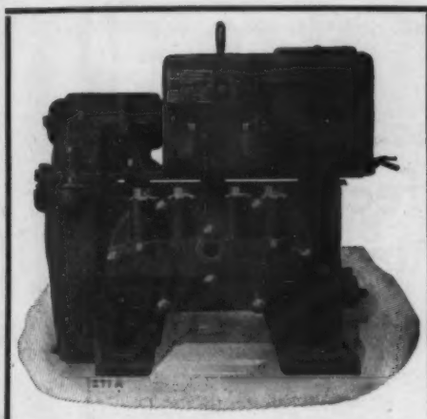

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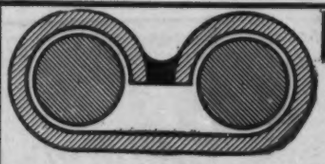

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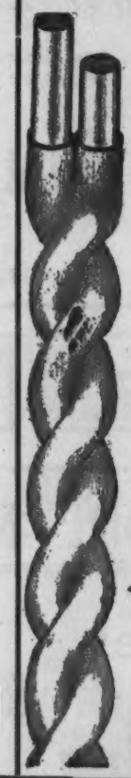

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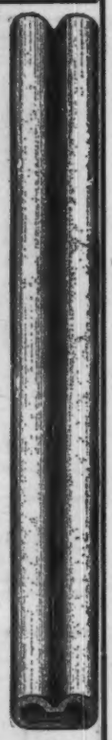

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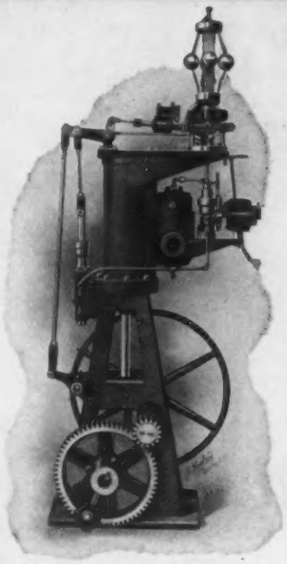

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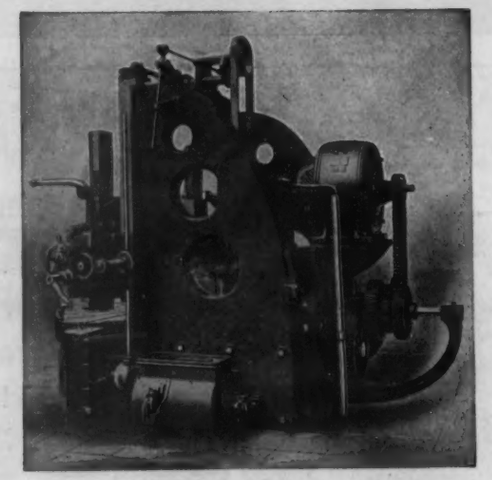

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TELEPHONE AND TELEGRAPH.

Emeryville, Cal.—The town trustees have awarded a telephone franchise to the Home Telephone Company, and at the next meeting will adopt a franchise formally granting the company the right to use the city streets.

Oakland, Cal.—It is announced that the Pacific Telephone & Telegraph Company will spend $1,125,000 in improving the service on this side of San Francisco Bay. Of this amount about $400,000 will be spent in Oakland.

Berkeley, Cal.—In the ordinance just passed providing for a bonded indebtedness for public improvements, there is an item calling for $11,000 for the purchase and installation of a fire alarm telegraph system.

WATERWORKS.

Santa Clara, Cal.—A special election will be held in this city on April 8th to vote on an issue of bonds to the amount of $80,000 for municipal improvements. Of the total amount, $21,000 is to be used for the reconstruction and repair of the water, light and power works.

Tucson, Ariz.—Large flows of water are being developed along the Santa Cruz River, south of this place, by means of pumping plants. A plant to cost $20,000 is now projected on the Canoa Ranch, where a flow of 7,000 gallons per minute is to be developed.

Santa Ana, Cal.—Officials of the Edison Electric Company are here figuring on the cost of replacing steam by electric power in the local waterworks.

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TRANSPORTATION.

Winters, Cal.—The Vallejo and Northern Electric Railway Co. has applied for a franchise along the Vallejo water front, and the Monticello Steamship Co. has asked for the same ground. The city trustees have postponed the consideration of the requests until a special meeting. The railroad has announced its intention to put in a line of steamers to compete with the other corporation for the San Francisco traffic. The survey of the railroad passes through Pleasant Valley and crosses Putah Creek in the richest fruit district of Yolo County, and the company promises to be a strong rival of the Southern Pacific in the fruit-carrying line.

Redlands, Cal.—It has been announced that a double track will be laid by the local traction company on Orange and Cajon streets.

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TRANSPORTATION.

Colusa, Cal.—Because of the deadlock over the desired water-front franchise it is rumored that the Northern Electric Co. will not come to Colusa, but will build into Williams. The surveyors are working two miles south of Colusa, surveying west.

Bisbee, Ariz.—Work has begun on the Warren-Bisbee electric street car line, which is to have a total length of five miles. The contract has been awarded, and the construction will be finished in 170 days.

Pasadena, Cal.—The survey of the La Canada, Pasadena and Los Angeles railroad has been completed to within a short distance of Devil's Gate, and laborers are being sent in to put up buildings and prepare for graders.

Los Angeles, Cal.—The city council has repealed the ordinance granting a subway franchise on North Hill Street, connecting Sunset Boulevard and First Street, to the Los Angeles-Pacific Electric Co. The Company was to pay $1,000 for the privilege, but made no tender of the money and declined to bid for the connecting subway between First and Temple streets.

San Francisco, Cal.—The Bay Counties Electric Road, which a few days ago secured a continuous right of way from Richardson's Bay to Lakeport, is busily engaged in making surveys and arranging for the work which is to start within the next sixty days. The road, which is to be operated by electricity, will have a terminus near Belvedere, and the trip from there to San Francisco will be made in about forty minutes. From Belvedere the road will be built to Greenbrae across the marsh, thence over the lands of the Ferris, Mackay and Flood estates. A large depot will be built in San Rafael. From there the road will continue through the Town Ranch into Novato, through Sonoma County to Lakeport, Lake County.

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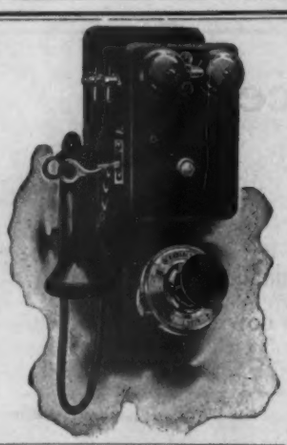

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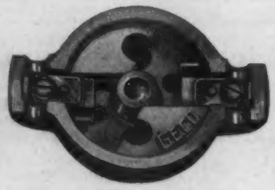

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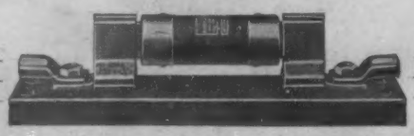

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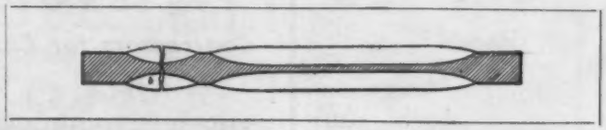

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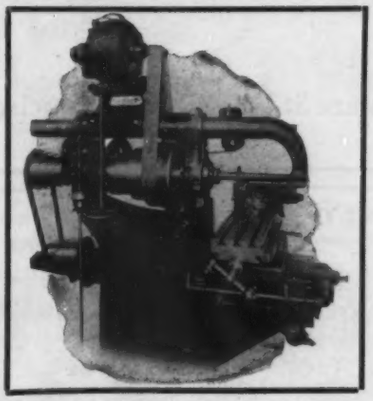

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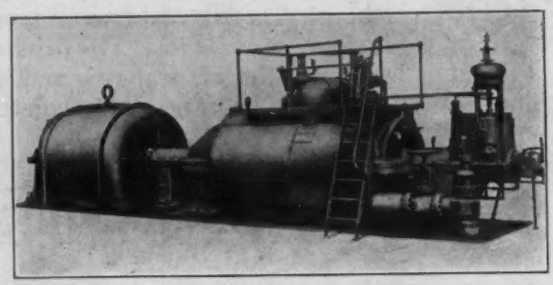

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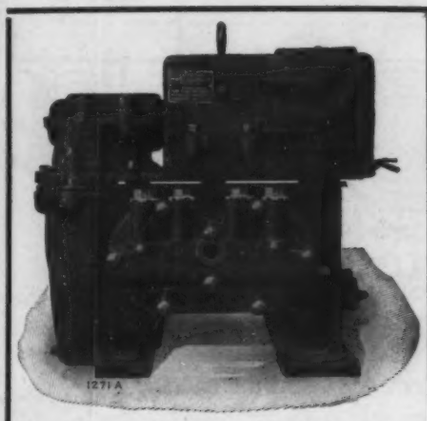

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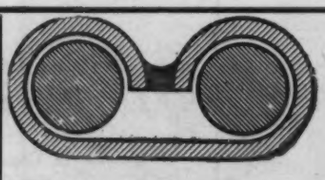

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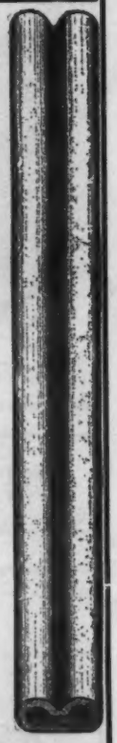

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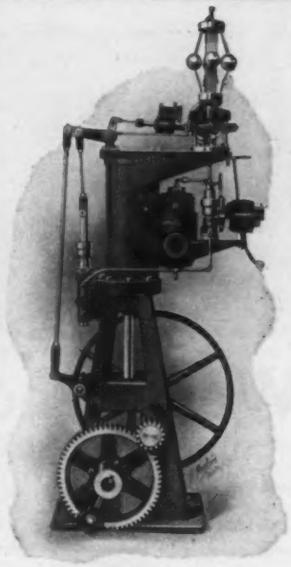

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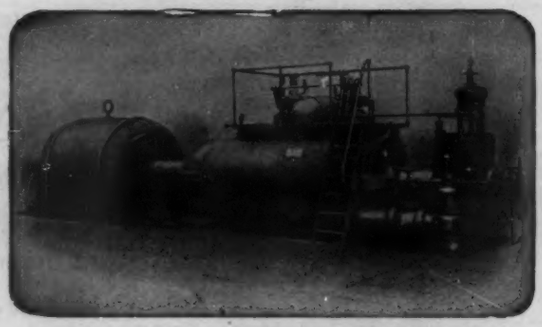

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POWER AND LIGHT PLANTS.

Tumwater, Wash.—The Olympia Brewing Co. will erect a large electrical power plant here.

Rockford, Wash.—Council awarded contract to the Rockford Light & Power Co. for twenty street lights.

Tacoma, Wash.—The Davies Electric Co., capital $150,000, has been incorporated by M. C. Davies, H. W. Davies, A. W. Lewis and E. C. Wheeler.

North Yakima, Wash.—It is reported that the new plant of the Northwest Light and Power Co., located twelve miles up the Naches River, will be completed in April.

New Westminster, B. C.—V. W. Hunt, of the B. C. Electric Ry. Co., has been appointed engineer in charge of the work of installing the new water power units at Lake Bunt-

Leavenworth, Wash.—Bids will be received by Guy A. Hamilton, city clerk, until April 23rd, for an electric light and water franchise.

Fallon, Nev.—It is stated by government engineers that the United States government is planning to erect a power plant on the Truckee-Carson irrigation canal.

Astoria, Ore.—The Astoria Electric Co. has awarded contract to W. S. Dole & Co., of Portland, for the construction of its new gas plant here, to cost $12,000. C. A. Coolidge, general superintendent.

Albany, Ore.—The Sanitam Electric Co. is arranging for the construction of seven power canals along the North Sanitam River. Joseph M. Healy, of Oregon City, is interested.

Boise, Ida.—The promoters of the Oxbow project will build a line to this place, a distance of 105 miles. The project is being developed by W. and S. Mainland, Oshkosh, Wisconsin.

Chihuahua, Mex.—The company owning the Pinos Altos Mines is preparing to put in a hydro-electric plant about three miles from the little town of Pinos Altos. The surveys have been made by J. H. Cooper, of Parral.

Kingman, Ariz.—George M. Chartier, and others of Los Angeles, have been here in conference with Superintendent Porter, of the Goldroad Mining Company in regard to the proposed electric power plant at Kingman.

Helena, Mont.—Work has been completed on the dam and power plant of the Helena Power & Transmission Co., on the Missoula River near here. The plant has a capacity of 15,000 horsepower.

Kalispell, Mont.—O. V. Farrar, superintendent of the Flathead Valley Water Power Co., states that new machinery is to be added to the Big Forks system to increase the capacity 750 horsepower.

Seattle, Wash.—The estimate for the installation of the cluster lights on Third Avenue, Third Avenue South, Prefontaine Place and Fourth Avenue South, as prepared by the city engineer, is $104,100.

Tacoma, Wash.—Manager E. J. Felt, of the Pacific Traction Co., announces that his firm would in a short time begin the erection of a 40,000-horsepower electric plant in or near this city.

Boise, Ida.—The Great Shoshone & Twin Falls Water Power Co., capital $1,500,000, has been incorporated for the purpose of taking over all the property of the Shoshone Falls Power Co., Ltd., at Shoshone and at Twin Falls. W. S. Kuhn, of Pittsburg, Pa., is president.

Bellingham, Wash.—It is reported that Stone & Webster will build a large addition to its Nooksack Falls plant to cost $500,000 to supply power for the new cement plant to be erected at Kendall by the Northwestern Portland Cement Company.

Tacoma, Wash.—It is reported that H. E. Salisch will erect a large power plant on the Nesqually River, near Elbe. Plans are being prepared by the Westinghouse Electric Mfg. Co. for the complete electrical equipment and construction of the plant.

Los Angeles, Cal.—The city council has approved a conduit map providing for the erection of an electric power plant on Division Creek, in Owens Valley. This plant is to furnish power to be used in driving the big tunnels along the right of way of the aqueduct.

Chihuahua, Mex.—A contract has been signed with S. P. Applewhite, of Mexico City, for the development of electric power in the Rio Grande district of Cuicatlin, State of Oaxaca. Mr. Applewhite proposes to supply electricity to Oaxaca and vicinity.

Aberdeen, Wash.—It is definitely announced that the Grays Harbor Railway & Light Co. will at once begin work on an immense power house near Electric Park. This plant and other contemplated improvements will cost $250,000. The main building will be of brick, 100 feet square.

Williams, Cal.—C. L. Schaad, president, and S. A. Lindstrom, electrical engineer of the Colusa County Telephone Company, have been spending some time at Fonts Springs planning a system of flues, dams and pipe lines for a power system at that place. The waters of the North, Middle and South Forks of Stony Creek are to be brought to a common point where there is a fall of 600 feet to the site of the power house below.

New Westminster, B. C.—The B. C. Power & Electric Company, Ltd., has filed an application for 3,000 miners' inches of water to be taken from the Squamish River and the Cheakamus River and its tributaries. The water is to be used in operating a huge plant for generating electricity for heating, lighting and power for manufacturing, industrial and mechanical purposes. The difference in altitude is about 300 feet, and the water will be conveyed to the required spot by means of dams, pipes, flumes and ditches.

TELEPHONE AND TELEGRAPH.

Oregon City, Ore.—Council granted a franchise to the Home Tel. Co.

Dillon, Mont.—The Bell Tel. Co. has commenced stringing wire from here to Salt Lake City.

Chehalis, Wash.—The Home Tel. Co. has applied to county commissioners for a 25-year franchise.

Dayton, Wash.—The P. S. Tel. & Tel. Co. propose installing the central energy system at this place.

Moscow, Ida.—The Inter-State Telephone Co. will shortly install a new common battery board.

Fernie, B. C.—The Revelstone, Trail & Front Lake Tel. Co. will build a long distance line to Elkmonth and Hosmer.

Bellingham, Wash.—Thirty men are at work preparing for the installation of new instruments for the Sunset system.

Maple Falls, Wash.—The Maple Falls Tel Co. has been incorporated by John P. Ashlund, H. J. Strickfaden and D. M. Stewert.

Lynden, Wash.—James Trapman has been awarded the contract for erecting the Farmers' Tel. building to be 18x26 feet, to be built of concrete and brick.

Edmonds, Wash.—The Independent Tel. Co. of Seattle has obtained a franchise for a local exchange. They will erect their own building for use as a central exchange.

TELEPHONE AND TELEGRAPH.

Bakersfield, Cal.—The Board of Supervisors has granted permission to the Standard Oil Co. to lay a pipe line and erect a telephone line along the county roads.

Asotin, Wash.—F. B. Simpson, who has had supervision of the Asotin Tel. Co., has sold his interest to J. N. Cunningham, of Clarkston, for $3,500.

Dillon, Mont.—Clay Patterson was elected president of the Dell Tel. Co. Construction work on the lines will be started as soon as supplies can be secured.

Umatilla, Ore.—The Farmers' Co-operative Tel. Co., capital $5,000, has been incorporated by Omer O. Stephens, De Witt C. Brownell and John W. Duncan. They will build, construct and maintain telephones in Umatilla County.

Spokane, Wash.—M. A. Phelps, president of the Interstate Telephone Company, announces that the temporary quarters on Post Street will be made permanent, and in addition to this it is purposed to establish a number of substations. He added:

"Our Coeur d'Alene exchange is now being installed, and we expect the work to be completed in a short time. We are also establishing an exchange at Post Falls. We are now extending our lines from Granite to Thompson Spur, in Idaho, a distance of five miles."

Spokane, Wash.—M. A. Crumbacher, of the Pacific Telephone and Telegraph Company, announces that plans have been completed to install a common battery system at Dayton, Wash., to cost $15,000. The present system of ten-party residence and four-party business lines will be abolished for four-party residence and two-party business. Although the installation of the new system will be a radical change, the subscription rates will remain practically unchanged.

Spokane, Wash.—W. J. Mogridge, of Spokane has been awarded a patent on a telephone receiver holder. The receiver is held in place by a light metal frame, which is attached to the transmitter. When not in use the receiver rests on a small bar, which automatically opens or closes the connection. When tilted forward for use the receiver is brought in position for the ear without requiring the support of one's hand, so that the person talking is allowed the use of both hands. It may be attached to either a desk or wall phone.

Spokane, Wash.—Extensive alterations and improvements are being made by the Pacific Telephone and Telegraph Company in its Spokane system, and when these are completed it is announced between 14,000 and 15,000 instruments will be in operation. The entire system is being overhauled, and with the installation of the new switch-boards the capacity will be increased from fifteen to twenty-five per cent. The company has unfilled orders for from 800 to 1,000 phones, but under the old system it was out of the question to put them into service. The principal change is to cut out the express system, now in use, and install the central energy system.

Spokane, Wash.—Resolutions adopted without a dissenting vote by the council of Sandpoint, Ida., northeast of Spokane, are designed to compel the Bell Telephone Company to vacate, within thirty days, the streets and alleys in the town taken without authority or franchise. The town counsel declares that the council never granted more than permission to the company to operate a toll station, but in the face of this the concern has taken possession of the streets and alleys and is doing a local business as if fully empowered by franchise. The council declines to grant a franchise to any company without binding it to unite with the other companies on local business, with a view to saving the people the necessity of having more than one instrument in their homes and places of business. The Bell Company declines to accept a franchise with such a limitation.

Eureka, Cal.—An improvement campaign which will cost about $125,000 has been laid out by the Pacific Telephone & Telegraph Co. A. E. McLaren, the local manager, declares that the improvements will be begun in a few days. A telephone exchange is to be built and a general overhauling of the company's outside equipment is also scheduled, together with the installation of a switch-board and tool-board, both of the latest type. The new building will be two stories high and will cover an area 49x70 feet. The plans are now being drawn by the engineering department, and the actual construction will be commenced in a few weeks. At Arcata and Ferndale additional sections are to be added to the switch-boards.

Oakland, Cal.—Improvements to the amount of over $1,000,000 will be made immediately by the Pacific Telephone Co. in its plant in this city. Among the improvements contemplated are remodeling the main office on Franklin street by building an extension which will enable the company to use the present operating room for the switch-board service of the company. The number of operators will be increased by twenty-five. It is proposed to put the outside wires all on cable basis, and these changes will be made at once. The East Oakland, Berkeley and Alameda offices will also be materially enlarged and the service generally improved. One of the main features of the improvements in prospect is the laying of a large number of underground cables.

TRANSPORTATION.

San Diego, Cal.—A strong possibility exists that the proposed extension of the Bartlett electric railroad system to La Mesa Springs and El Cajon Valley will be paralleled to a certain extent, at least, by the Spreckels lines.

Monterey, Mex.—A new company has been formed in San Pedro for the purpose of constructing a street car line in that city. The company is headed by Andros Medellen, who is president, and Manuel Gonzales, who is secretary and treasurer.

Reno, Nev.—Col. Hopkins has started surveying for his electric car line from Reno to Steamboat Springs, twelve miles south of this city. He states that the line will be surveyed and completed in four months. It will later be built to Carson City.

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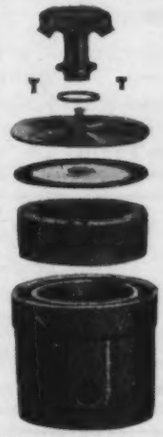

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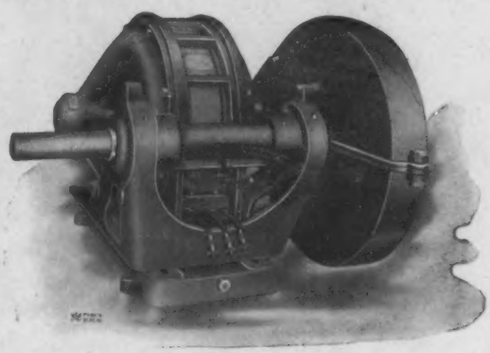

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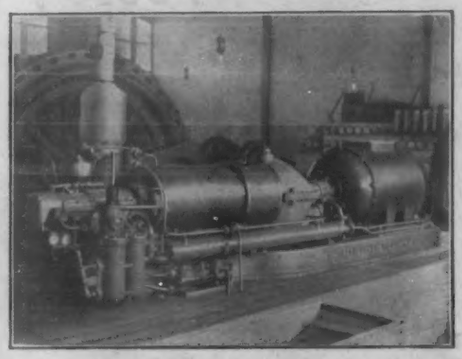

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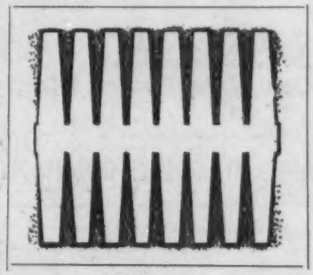

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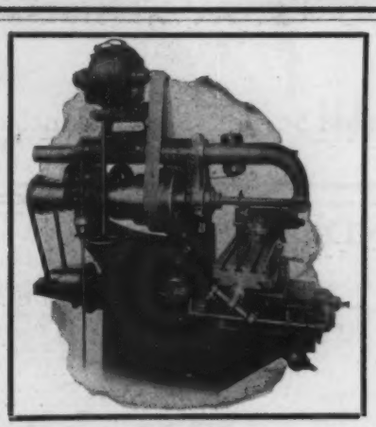

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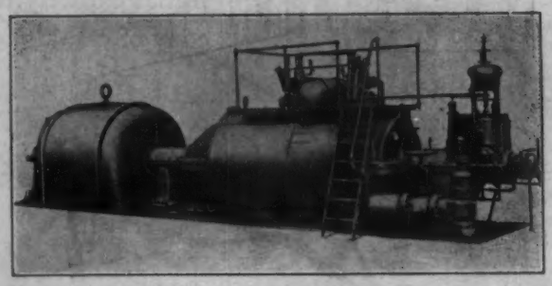

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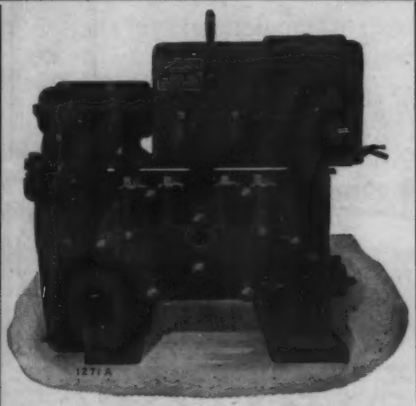

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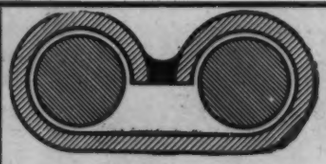

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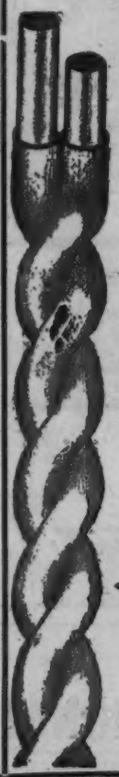

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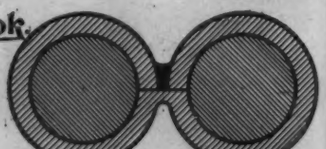

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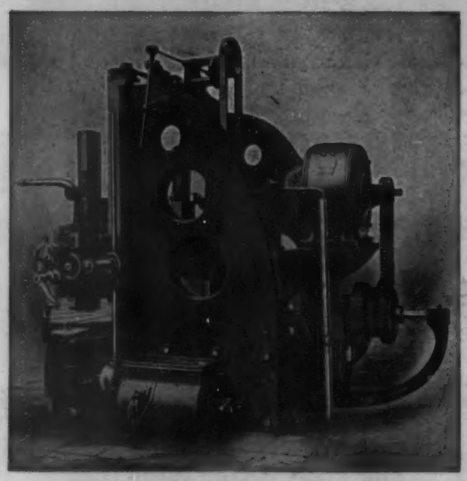

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FINANCIAL.

Porterville, Cal.—The Pioneer Water Co. has declared an assessment of $1 per share, delinquent April 5th; sale day, April 26th.

Tulare, Cal.—The Visalia Midway Oil Co. has declared an assessment of .006 per share, delinquent April 15th; sale day, May 15th.

San Francisco, Cal.—An assessment of ten cents per share has been declared by the New Center Oil Co. On April 1st the assessment will be delinquent; sale day, April 16th.

San Diego, Cal.—This city voted and issued $795,000 in bonds March 12th. The money is to be used for municipal improvements, chiefly extension of water and sewer systems. There were seventeen items, carrying a total of $884,000. Three of the minor ones were defeated.

San Bernardino, Cal.—A $1,000,000 bond issue for the extension of the San Bernardino Traction Co. has been arranged through the Los Angeles Trust Co., which secured the bonds. Under the trust deed the company will issue five per cent. bonds of the par value of $1,000 each, interest payable semi-annually and maturing March 1. The transaction is signed by A. C. Dennan as president and A. G. Kendall as secretary.

Round Mountain, Nev.—Probably the largest deal ever closed in this district was consummated when the Round Mountain Daisy Mining and Milling Company purchased all the water rights in the district for $185,000. The rights, include all the water in Jefferson Creek and the springs on the Shoshone and Indian ranches. The supply is sufficient to furnish all the mines in this portion of the country with water for milling purposes. The Daisy Company is now constructing a large reservoir and is preparing to furnish the miners of this part of Nye County with all the water they need for milling purposes.

San Francisco, Cal.—The United Railroads of this city have issued a statement of gross earnings for last December and the year 1906. The December gross receipts were $562,200, or $68,804 less than for the same month in 1905. According to the company's statement, gross earnings for 1906 amounted to $5,955,787, as compared with $7,059,003 for the preceding year. No mention is made of its operating expenses. Local investors have bought an additional million dollars worth of the bonds of this company. This means that $18,000,000 of these securities are now held in San Francisco. It is said that less than 200 shares of the street railway syndicate's $40,000,000 of stocks are held in this city.

Fresno, Cal.—H. E. Huntington, of Los Angeles, is the head of the Sierra Nevada Electric Co., which was incorporated in this city last week. It carries a capital stock of $1,000,000. The company purposes to supply power for lighting and irrigation for the greater portion of the San Joaquin Valley. With Huntington in the project are associated William G. Kerchoff, A. C. Balch, J. S. Eastwood and Frank H. Short. It is believed that the recent forming of the company was hastened by the recent change that was made by the United States Bureau of Reservations, whereby the Department of Forestry was accorded unlimited control of the timber and water reservations in both California and Nevada.

TRANSMISSION.

San Francisco, Cal.—A contract has just been closed with the Westinghouse Electric and Manufacturing Co. for the power house equipment for the new plant of the Battle Creek Power Co., on Battle Creek, Shasta County. Two of the generating sets are of large capacity with generators of 4,000 kilowatts each, and the third generator is of 2,000 kilowatts. They will generate three-phase, sixty-cycle current at 6,600 volts, which will be stepped up to 45,000 volts for transmission. Three Pelton impulse water wheels with an aggregate capacity of about 12,500 horsepower will be directly connected to these generators. Exciters and auxiliaries are included in the contract.

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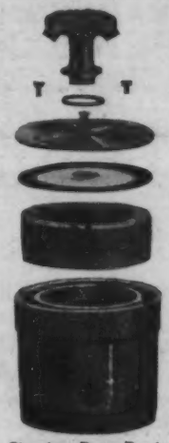

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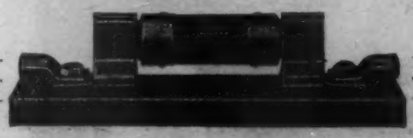

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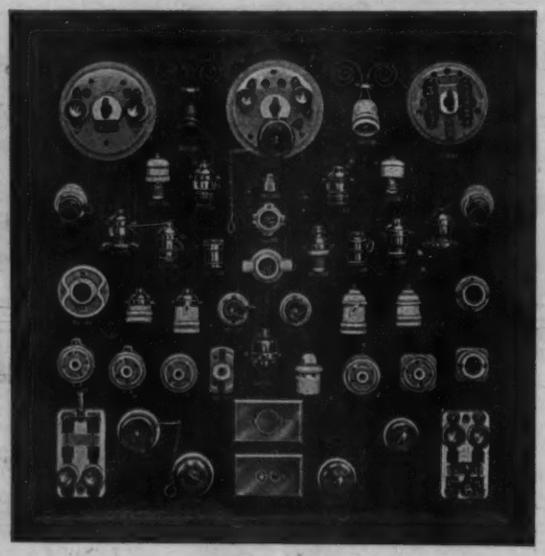

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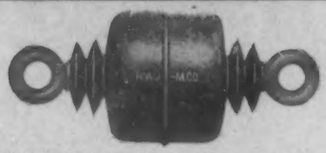

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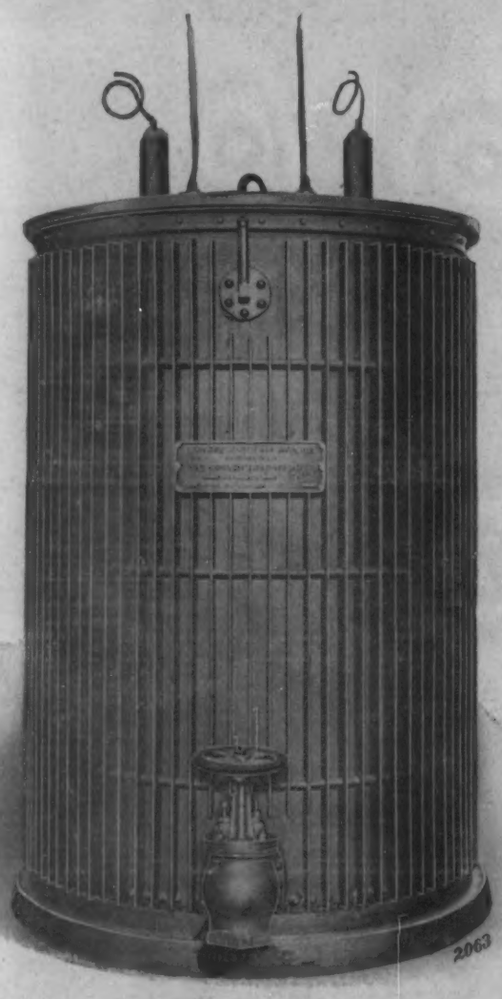

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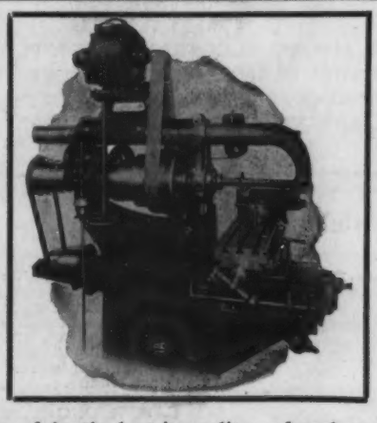

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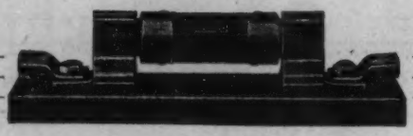

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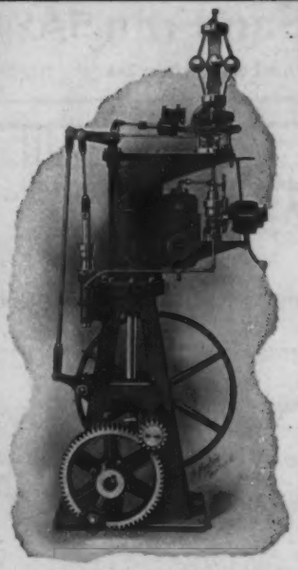

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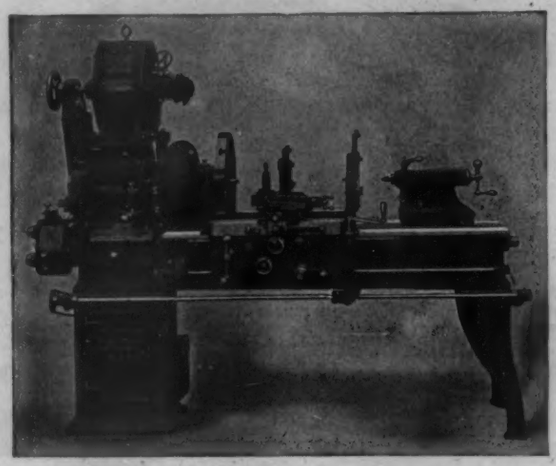

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ENGINEERING.

Kalispell, Mont.—Plans are being prepared by the Flathead Valley Water Power Co. for improvements to the Big Fork Electric Power & Light Co. to cost $50,000.

Thorp, Wash.—The Tacnum Water Company, capital $150,000, has been incorporated by David T. Edwards, Fremont L. Calkins, C. A. Splawn and others.

Portland, Ore.—Sealed bids will be received at the office of the U. S. reclamation service until April 15 for the excavation of the Keno Canal near Klamath Falls involving about 80,000 cubic yards of earth and rock excavation.

Medford, Ore.—The Sterling Mining Co. has completed a survey for a twenty-one-mile ditch. The work will cost $50,000 and furnish water for 7,000 acres. The work is to let by contract, to be completed by March 1, 1908.

Bellingham, Wash.—Bellingham citizens will meet Congressman W. E. Humphrey and Major Chittenden, of the United States Engineering Corps, in this city April 4th, to discuss desired improvements in Bellingham Bay.

Salem, Ore.—The Josephine-Klamath Company, capital $1,000,000, has been incorporated by F. William Russ, F. D. Smith and R. C. Maxwell. The company will engage in agricultural, mining and irrigation work in the counties of Josephine and Klamath.

Payette, Ida.—The construction company, of which R. W. Farris is the chief engineer, has submitted a proposition to the irrigation district to build the pumping plant project which would irrigate 10,000 acres. Estimated cost, $300,000 A. J. Wiley, engineer.

Spokane, Wash.—The Washington Land & Irrigation Co., owners of Fairview Heights, on White Bluff prairie, has made arrangements to irrigate this tract by means of wells. The officers of the company are: C. M. Crego, president; Maxon Chase, secretary, and A. M. Tate, treasurer.

Anacortes, Wash.—A local company has been organized here to dredge Fidalgo harbor. Among those interested are William Rodgers Lumber Co., Fidalgo Lumber Co., Anacortes Shingle Co., Baty Shingle Co., Burpee Bros. Co., Burke & McLean Shingle Co., Eureka Shingle Co., Cavanaugh Shingle Co., and P. E. Berard & Son.

Woodland, Cal.—The Sunset Telephone Company is making an effort to absorb the various farmers' lines that are now being operated in Yolo County, and has offered to connect all these lines with the Woodland exchange. The directors of the farmers' lines have decided to give the subscribers a voice in the matter before making an answer.

Los Angeles, Cal.—At a recent meeting of the city council the maximum rate which can be charged for unlimited service by both the Sunset and Home 'phone companies was fixed at $5.00. The rates for residence telephones are to remain as at present. Representatives of the telephone companies who were present were given no opportunity to protest.

Williams, Cal.—C. L. Schaad, president, and S. A. Lindstrom, electrical engineer, of the Colusa County Telephone Co., have been spending several days at Fonts Springs. Surveyors are busily engaged in locating lines for a system of flues, dams and pipe lines for a power system. The site of the power house has been located and one of the units which is to produce 3000 horsepower has been decided upon.

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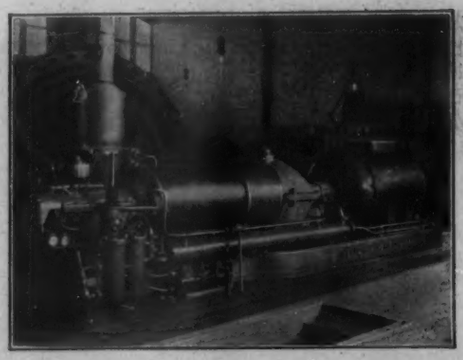

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FINANCIAL.

Lindsay, Cal.—An assessment has been levied by the Lindsay Water Development Company, due February 9th. Sale day is April 1st.

Hanford, Cal.—An assessment, delinquent February 1st, has been levied by the Washington Petroleum Company. The sale day has been set at April 13.

Bakersfield, Cal.—The annual meeting of the stockholders of the Superior Oil Company has been called for March 25. It will take place in Room 21, Bank of Bakersfield.

San Francisco, Cal.—President H. H. Noble of the Northern California Power Company, has submitted the annual report of the finances of the corporation. It shows that the net income has increased from $75,414.40 for the previous year to $96,243.37 for last year, a net gain of $20,828.97. During the year dividends amounting to $60,000 were paid, and $36,243.37 was reinvested in land, water rights and extensions.

Tonopah.—In order to facilitate the carrying out of the many improvements which are contemplated by the Nevada Power, Mining and Milling Company, the Nevada-California Power Company has been organized to take over all the property, water rights, and assets of the former company, and it has assumed all the liabilities as well. The new company is identical with the old one in ownership, control and management. It has a capitalization of $5,000,000, while the old company was capatilized at but $1,000,000. The new company by its charter is authorized to issue $3,000,000 in bonds, while the old corporations was limited to an issue of $1,000,000. The following extensions and improvements have been decided upon and contracts let. The extension of the company's power lines in the Bullfrog district and the installation of electric power and light systems in the entire Bullfrog district. The construction of an entirely new transmission line from Bishop Creek, Cal., to Silver Peak, Miller and Tonopah, to connect at the latter place with the present transmission line and giving duplicate service at all points now reached by the company's lines. The construction of two additional generating plants at Bishop Creek, which will more than double the generating capacity of the corporation. The construction of two reservoirs on Bishop Creek, the largest of which will have a capacity of 300,000,000 cubic feet, for the purpose of impounding the water supply so as to add to the low flow at certain times of the year. The construction of new transformer stations at Tonopah, Miller, Silver Peak, Goldfield and Rhyolite. It is estimated that the whole work of improvement will cost about $1,500,000.

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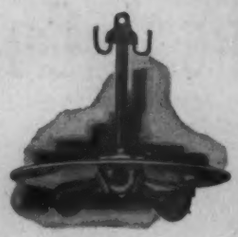

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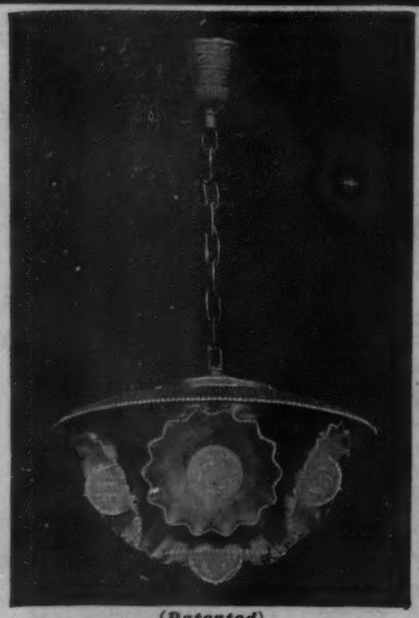

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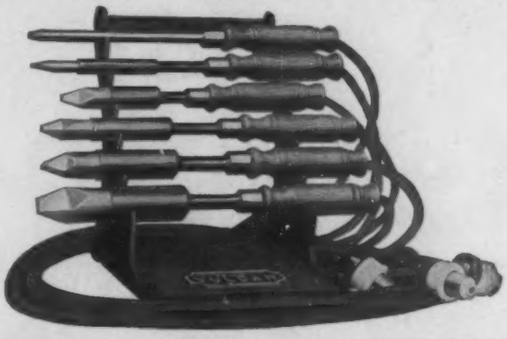

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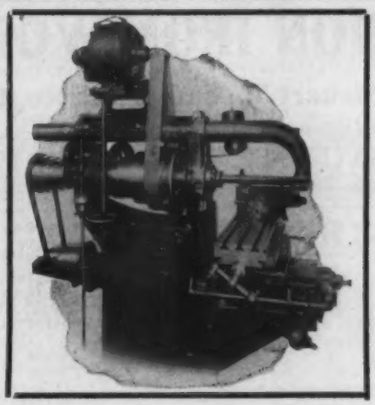

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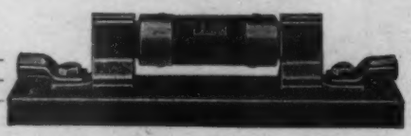

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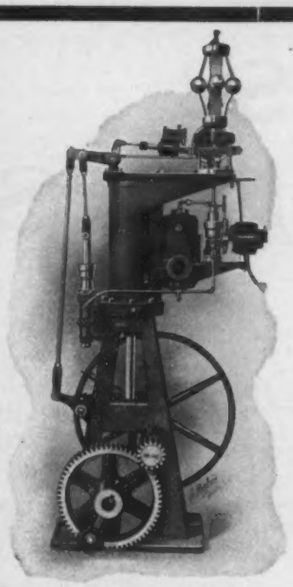

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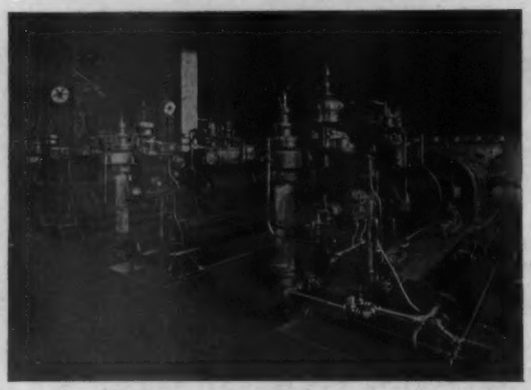

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ELECTRIC RAILWAYS.

Portland, Ore.—Council granted a franchise to the Portland & Mount Hood Railway Co.

Everett, Wash.—A. E. Sander has just let a contract for an additional five miles of road.

Georgetown, Wash.—The Seattle Electric Company has petitioned Council for a franchise along Bateman Street and across the new Duwamish River bridge to Oxbow.

Puyallup, Wash.—The Wescott Tracklaying Company will begin work at once on the Pacific Traction Company's new American Lake line.

Vancouver, B. C.—The Canadian Pacific Railroad surveyors are surveying for an electric line between this place and Chilliwack.

Columbia, Wash.—Council granted a franchise to Seattle Electric Company for right-of-way over several streets. The line is to be an extension of the Rainier Heights line.

Spokane, Wash.—The Washington Water Power Company is building a double-track line to connect its Maple Street line and Pacific Avenue line on Maple Street.

Helena, Mont.—The Helena & Butte Electric Railway Company has been incorporated with a capital of $500,000. A. W. Varharen, engineer, will commence the preliminary survey at once.

Spokane, Wash.—Engineers of the Spokane & Inland Empire Ry. Co. will make a preliminary survey of the branch line to Rockford and through the Rock Creek Valley into the Coeur d'Alene reservation.

Astoria, Ore.—Council granted a thirty-year franchise to E. B. McFarland for a street railway leading from Commercial Street to the county bridge at Young's Bay where it is to connect with a railway running to Warrenton and New Astoria.

Lewiston, Ida.—G. W. Thompson, president of the Lewiston & Southeastern, states that work will soon be commenced on the electric line and the installation of the power plant. The work will be done by the Schofield Company, of Philadelphia.

Medford, Ore.—Messrs. Blakely & Welch, of the Sterling Mining Company, have applied to council for a franchise for an electric railway to be built from this place to Jacksonville. They also purpose to take over the city light plant and water works systems.

Seattle.—The Seattle Electric Company was granted a franchise on the following streets: Taylor Avenue, Third Avenue south, Nineteenth Avenue, parts of Yesler Way, Prefontaine Place, Thirty-first Avenue, Ewing Street, and on parts of Summit Avenue.

Hamilton, Mont.—The Missoula-Bitter Root Traction Company was organized here by J. L. Humbe, Corvallis; E. O. Lewis, Stevensville; C. M. Allen, Lo Lo; P. J. Shannon, Hamilton, and P. M. Reilly, Missoula. The road will be forty-seven miles long and cost $750,000.

Spokane, Wash.—F. A. Blackwell has begun the construction of a railroad to run from the junction with the Spokane-International at or near Rathdrum, Ida., to Spirit Lake; thence to Newport and up the Pend O'Reille River. The road will be 70 miles in length and cost $2,000,000.

TRANSMISSION.

Jalisco, Mex.—Plans for the hydro-electric plant to be erected by Carlos Romero have been modified. He will use the waters of the Jora River, and will begin work on the plan within a short time.

Los Angeles, Cal.—Bids are advertised for for a tangential water wheel for equipping one hydro-electric generating plant of 125 kilowatts capacity, five miles of 15,000-volt transmission line and step-up and step-down transformers by the City Board of Public Works.

Napa, Cal.—An application has been made to the Board of Supervisors by Harry Brown for a franchise for forty-five years to erect and maintain along the public roads of this county, poles and wires for transmitting current for heat, power and lighting.

Weaverville, Cal.—H. L. Jackman, general manager of the North Mountain Power Company, has been spending a few days in this town. It is reported that his company intends to put in a power plant at Big Flat, about seven miles below North Fork, and will build a 70-foot dam in the Trinity River, which will be used for generating power.

Red Bluff, Cal.—R. P. Stice has filed on 10,000 inches of water in Mill Creek, to be diverted about the center of Section 1 at a place known as Squire's Marsh. M. O. Ballard, who is connected with the Pacific Power Company, filed on 20,000 inches to be diverted near the Avery foot bridge. Both filings were made for the purpose of securing power to produce electricity.

Redding, Cal.—A ten-year contract has been closed between the Trinity Copper Company, otherwise known as the Tom Lawson corporation, and the Northern California Power Company, for electric power to develop the Shasta King Mine. The Trinity Copper Company has provided a 200-horsepower motor at the mine for immediate use. The Northern California Power Company is installing a 2,000-horsepower plant for the use of the Mammoth Mine; a 1,200-horsepower plant at Herault for an iron smelter. An electric plant will be supplied for the Crown Deep Mine.

Nevada City, Cal.—When the weather clears 150 men and 50 horses will go to work on the big power plant on Deer Creek, above this city, in an endeavor to hurry it to completion as rapidly as possible. Practically all the machinery necessary was hauled to the place before the winter's snows set in. The plant is being constructed by the California Gas and Electric Company. It will not be until Autumn that the work will be completed. There are pipe lines to be built, reservoirs to construct, and a myriad of incidental labors to perform. The company will find use for its power in the operation of the Midland road.

WATER POWER.

Washington Water Power Company—Stockholders at a meeting in Spokane voted to increase the capital stock from $5,000,000 to $10,000,000, and it is announced by Henry M. Richards, president, that the money will be expended in betterment of the electric railway system and the extension of several lines. The directors were re-elected as follows: William A. White, George H. Southard and Frank Lyman, of New York; H. M. Richards, D. L. Huntington, J. D. Sherwood, Thomas G. Thomson, J. P. M. Richards, A. B. Campbell, J. N. Glover and Huber Rasher, of Spokane. The officers of the company re-elected for the year are: President, Henry M. Richards; first vice president, A. B. Campbell; second vice president and general manager, D. L. Huntington; treasurer, H. E. Perks; secretary, H. L. Bleeker. The corporation has 72.5 miles of railroad, 54.5 miles of which is in Spokane. Its power transmission lines reach 225 miles, the longest being to the Coeur d'Alene mining camps, 110 miles.

POWER AND LIGHT PLANTS.

Everett, Wash.—The Seattle-Tacoma Power Co. is planning to parallel its lines into Everett from Snoqualmie Falls.

Battleford, Sask.—Bids will be received until April 15th by R. C. Lourie, Clerk, for installing an electric lighting system.

Albany, Ore.—The Samtam Electric Company is arranging for the construction of seven power canals along the North Samtam River.

Indian Head, Sask.—The city will spend $25,000 this year in extensions to the electric lighting plant. T. E. Donnelley, mayor.

Missoula, Mont.—A new 4,000 H. P. water power plant is now being constructed by the Missoula Light and Water Company. A. H. Wethey, manager.

Elma, Wash.—The Elma Light & Power Company has filed notices on what is known as the Cloquallum Creek water power.

Strathcona, Alta.—Council has granted a franchise to the International Heating & Lighting Company to operate a lighting plant.

Victoria, B. C.—Sealed bids will be received by W. W. Northcott until April 8th for the erection of an electric transmission line between this city and Beaver Lake.

Grand Forks, B. C.—The West Kootenai Power & Light Company is considering the extension of its high-tension hydro-electrical lines from the Boundary into the Similkameen district.

Portland, Ore.—The Pacific Light & Power Company, capital $50,000, has been incorporated by C. P. Houston, Junction City; D. A. Houston, Oregon City, and Alexander Sweek, of this city.

Astoria, Ore.—The Astoria Electric Company has awarded contract to W. S. Dole & Company, Portland, for the construction of its new gas plant here, to cost $12,000. C. A. Coolidge, superintendent.

Wallace, Ida.—G. Scott Anderson is at the head of a corporation which will erect a large power plant on Big Creek. The company will be incorporated for $300,000 under the name of the Inland Power Company.

Myrtle Point, Ore.—The Coquille Valley Power Company has been incorporated by J. R. Benson and W. W. Doyoe, of this place, D. H. Johnson and J. A. Davenport, of Coquille. The company has secured water rights and will erect a power plant in Coos County.

Hermiston, Ore.—The Western Mutual Electric Company has been incorporated with a capital of $50,000 by Jas. Tee, E. P. Dodd and others, to supply electricty for lighting and power to the territory under the Umatilla government project.

Bremerton, Wash.—Work has been commenced excavating for the foundation of the central power plant. The building will be 92x180 feet, the floor and basement of concrete, the superstructure of steel and brick. The work will be done by the workmen at the yard.

Ely, Nev.—Extensive improvements and enlargement of the system are being planned by the officials of the White

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Pine Telephone Company, which owns the only 'phone system in this portion of Nevada. The lines are to be extended to the new mining camps in this vicinity, and the service generally improved. An expenditure of $50,000 will hardly cover all the proposed work.

Big Timber, Mont.—Extensive improvements and additions are contemplated by the Big Timber Light and Power Company. A Westinghouse generator of 60 K. W. capacity, and a 90 K. W. dynamo will be installed. J. R. Karserman, manager.

TELEPHONES.

Yorktown, Sask.—The city voted to purchase the telephone system and extend it.

Moscow, Ida.—The Interstate Telephone Company will shortly install a new common battery board.

Boise, Ida.—The Independent Telephone Company is extending its system at Nampa, Caldwell, Payette, Weiser and Emmett.

Dayton, Wash.—The Smith Hollow Telephone Company has been organized by John Crawford, Dan Wood, Will Wood, Neils Peterson, John Story and "Doc" Sutton.

Fernie, B. C.—The Crows Nest Pass Electric Light & Power Company is preparing to establish telephone service to Elkmouth and Hosmer.

Harrington, Wash.—The Pacific States Telephone and Telegraph Company has a crew at work stringing a line to Bluestem and thence to Davenport.

Seattle, Wash.—The Independent Telephone Company announces that the Green Lake station will be opened this week. The building will accommodate 1500 instruments.

Gifford, Ida.—A number of farmers' telephone lines are building into Gifford and several more are contemplated. Those under construction are the Riggers-Jacks line from Riggers' mill, the Hamberley-Slocum line from the Hamberley ranch and the Boyer-Bluett line.

Fernie, B. C.—The Revelstoke Trail & Front Lake Telephone Company will build a long-distance line to Elkmouth and Hosmer.

Umatilla, Ore.—The Farmers' Co-operative Telephone Company, capital $5000, has been incorporated by Omer O. Stephens, DeWitt C. Brownell and John W. Duncan.

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INCORPORATIONS.

Los Angeles, Cal.—The Telegraph Oil Company has been incorporated with a capital stock of $300,000. Behind the project are H. M. Cowper, O. E. Seller and J. W. Reynolds.

San Luis Obispo, Cal.—Articles of incorporation have been filed by the Tally-Ho Oil Company, which is capitalized at $5,000, shares $1 each. The place of business is Arroyo Grande.

Sacramento, Cal.—The Western Sierras Power Co. has been incorporated here with a capital stock of 10,000 shares, $1,000 each. The full amount has been subscribed by C. C. Bonte, H. Stillman, E. S. Brown, A. L. Shinn and M. J. Dillman.

Santa Ana, Cal.—The Section Two Water Company has been organized and filed articles of incorporation to develop and distribute water. The principal place of business is Anaheim, and the plant and works of the company are to be located on section 2, township 4 N., range 10 W. The capital stock is $4,500. The directors are J. F. Walker, J. M. Blocher, O. S. Auten, W. Voss and F. R. Lagourgue.

Santa Ana, Cal.—With Alfred D. Bowen, builder of the California Ocean Shore Railroad, as president, the Monterey, Fresno and Eastern Railway Co. has been incorporated with a capital stock of $5,000,000, of which $154,000 has already been subscribed to build a shorter line to Goldfield from Southern California and bring both Los Angeles and San Francisco many hours nearer the great mining regions of Nevada. The plans of the company are to run electric trains. The route has not yet been made public, but probably will be south of Yosemite Park and through the Round Valley and Bishop Creek country.

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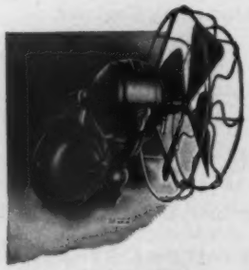

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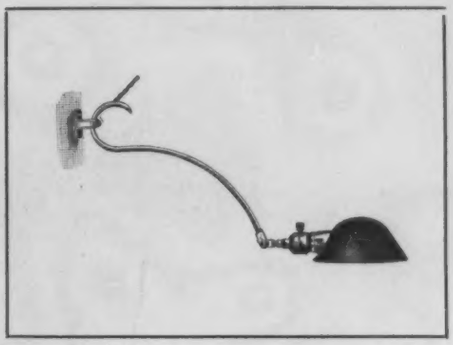

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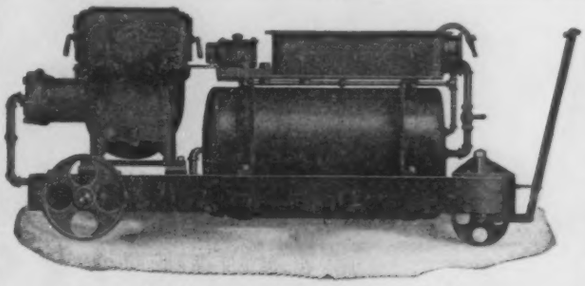

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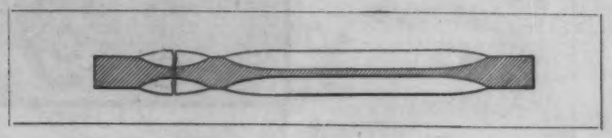

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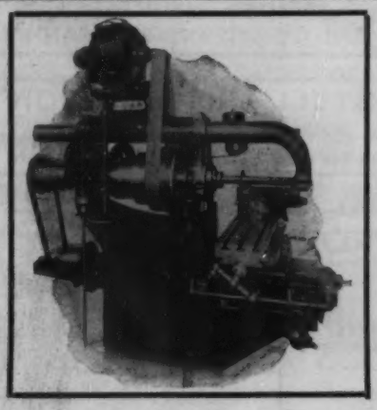

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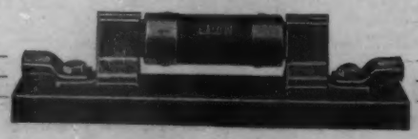

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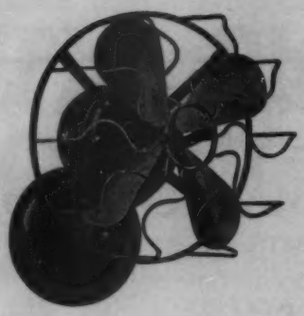

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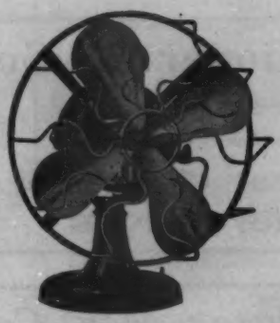

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WATERWORKS.

Los Angeles, Cal.—Sewell W. Thompson, a millionaire, and Gregory C. King, a mining man, propose to the city of Los Angeles that they be allowed the privilege of supplying water here at an output of $2,500,000. They have employed men to make preliminary surveys and have carried their investigations to a point where they can state definitely what amount of water they can secure and what will be the cost of a conduit, etc., for carrying it. The facts will be published in a few days. The bond election will not be held until about May 1st.

Imperial, Cal.—At a meeting of the Trustees last week a resolution was passed declaring that the water system was inadequate for the town, and the board instructed the town engineer to report on the works needed and the prospective expense of an entirely new system, to be built by the town. The proposed system shall be provided with cement settling basins, filtration systems, and an adequate pumping plant. The board also expects to install a power plant for supplying the town with electricity. It is proposed that bonds be issued by the city to cover the cost of the improvements.

Los Angeles, Cal.—Mayor A. C. Harper and the members of the City Council are convinced that some adequate and easily accessible water supply must be appropriated to tide the city over until the completion of the Owens River work. It may be said that they propose to conserve the water of several streams into a watershed comprising 650 square miles and capable of furnishing a constant flow of 7,000 inches for the city's use. Among those streams are the Piru, Castaic, Santa Clara, Elizabeth, and several other creeks. The Trustees have planned to carry the water through a main steel pipe which will bear the flow to Los Angeles. In the system as outlined there will be eighteen reservoirs. It will cost from $7,000 to $10,000,000.

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INCORPORATIONS.

Coalinga, Cal.—The Coalinga Southern Oil Company has been incorporated with a capital stock of $100,000. Behind the project are H. S. Bridge, J. F. Lucey, J. A. Punting, H. H. Welsh and T. Spellacy.

San Jose, Cal.—The Los Gatos Ice, Gas and Electric Company has been incorporated with a capital stock of $200,000. The directors are G. W. and C. E. Hume, Jay Deming, J. D. and Bessie Farwell.

Bakersfield, Cal.—The Ricardo Land and Water Company has been incorporated with a capital stock of $1,500,000. The directors are Rudolph Hagen of Ricardo, A. M. Lyon, J. S. Green, J. V. Ham, Charles E. Smith and H. P. O'Connor of Los Angeles.

San Jose, Cal.—The San Jose Traction Company has been incorporated with a capital stock of $1,000,000. L. F. Hanchett has taken the greater part of the stock subscribed. The other holders are John Martin, S. S. Baldwin, C. C. Benson and E. M. Rea.

Wallace, Idaho—The Tam O'Shanter Mining Co., capital $1,000,000, has been incorporated by D. C. Coates, C. E. Gammell, Samuel Hull, J. J. Curran and M. A. Curran. The Gold Crag Mining Co. has been incorporated by Steward Fuller, R. J. Fuller and B. O. Skonnord, capital $1,500,000.

OIL.

Los Angeles, Cal.—It is announced here that the Union Oil Company's pipe line across the Isthmus of Panama is in readiness to use, and the pumping of oil through the pipe from steamers on the west side to those on the east side will begin shortly. Two vessels are now loading at Port Harford with cargoes of oil for the isthmus. The capacity of the pipe line is 25,000 barrels daily, and it is expected to be a great aid to the development of the oil industry on the West Coast.

Paso Robles, Cal.—D. F. Swarts of Los Angeles, supposed to be acting for the Union Oil Company, has taken a lease of the Winteroll place of 1,600 acres located near here and agrees to go to work developing it for oil within sixty days. A company has leased four sections of the Nacimiento ranch and agrees to go to work at once. The lessee is also said to be an agent of the Union Oil Company.

Bakersfield, Cal.—The first shipment of pipe for the new line of the Standard Oil Company to the oil fields of the Midway and McKittrick districts has just been received here and work is to be started at once. The building of the line, which will be sixty-eight miles in length, is the result of a contract recently signed by the independent producers of the fields by which the Standard obtains the oil of the district for thirty cents a barrel.

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ELECTRIC RAILWAYS.

Boise, Ida.—S. E. Burnham was awarded the contract for laying the track for the Boise Rapid Transit Co.

Cheney, Wash.—The W. W. P. Co. has accepted the terminal site and will soon begin the construction of a depot and freight sheds.

Southeast Seattle, Wash.—The Seattle, Renton & Southern Ry. is replacing its old rails between Seattle and Columbia with 80-pound rails.

Tacoma, Wash.—Construction work will begin at once on the spur track from the Stellacoom line into section 11, by the T. R. & P. Co.

Boise, Ida.—Two carloads of electrical machinery for the Boise & Interurban have arrived and will be installed at once in the sub-stations.

Spokane, Wash.—The Spokane & Coeur d'Alene Electric Ry. has commenced the work of double tracking its line between Greenacres and Spokane Bridge.

Tacoma, Wash.—The Tacoma Railway & Power Co. will soon commence the extension of the American Lake line to Murray, a distance of about three miles.

West Seattle.—The West Seattle branch of the Seattle Electric Co. is being extended to effect a junction with the Fauntleroy Park at California Avenue and Ninth Street.

Seattle, Wash.—The Seattle Electric Co. has applied for a franchise on North Forty-fifth Street from Meridian Avenue to Fourteenth Avenue, n. e., the line will connect the Green Lake and University lines.

Missoula, Mont.—The Missoula Bitter Root Co. has been organized with a capital of $40,000 by P. J. Shannon, O. Blood, of Hamilton, J. L. Humble, of Corvallis, E. O. Lewis, of Stevensville, and P. M. Reilly, of this city. The company will construct and operate an electric line from Hamilton to this city through the Bitter Root Valley.

Everett, Wash.—Commissioners granted a franchise to the Puget Sound, Skykomish & Eastern Ry. Co. to build an electric line from Index, a distance of one and one-half miles; also to construct telephone and electric light systems.

Seattle, Wash.—The Seattle Electric Co. was granted a permit to double track its line between Fremont and Ballard.

Oregon City, Ore.—The Oregon City, Beaver Creek & Molalla Ry. Co., capital $100,000, has been incorporated by Grant B. Dimick, Thomas F. Ryan and J. W. Sherman, of Portland. The company proposes to construct and operate a steam or electric railway from this place to Beaver Creek, Highland, Liberal, Molalla and Wilhoit Springs.

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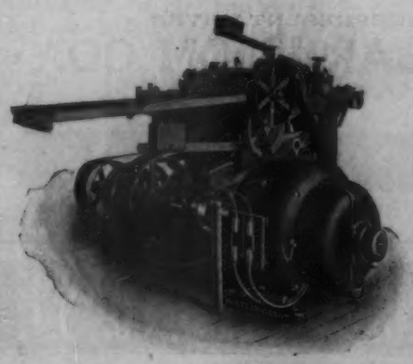

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836

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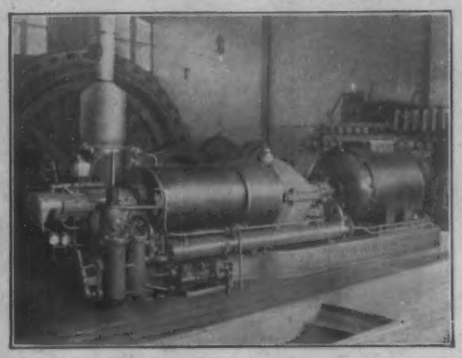
The Greater Reliability of Allis-Chalmers Steam Turbines and Generators



ALLIS-CHALMERS STEAM TURBINE AND GENERATOR INSTALLED

In the 500 K. W. unit illustrated above, as in all Allis-Chalmers turbines, are incorporated the channel-shaped shroud protecting the ends of the blading from injury; machine-cut slots in the foundation rings, insuring absolutely accurate spacing of the blades; and improved balance pistons, reducing the diameter of the cylinder and preventing distortion under varying temperatures. All three features of construction are patented, and controlled by us, in the United States, Canada and Mexico.

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— FOR OTHERS SEE OUR BULLETIN NO. 1054 —

¶ There is perfect balance of the rotating parts, both in the turbine and the generator, resulting in a minimum of vibration, quiet operation of the generator and remarkable coolness of the bearings, which are continuously and automatically lubricated. The revolving parts are designed for high peripheral speeds, with ample provision for ventilation. There is high steam economy, even at rapidly fluctuating loads, and the expansion is complete. These turbines are adapted to high steam pressures and superheat. They have a large overload capacity.

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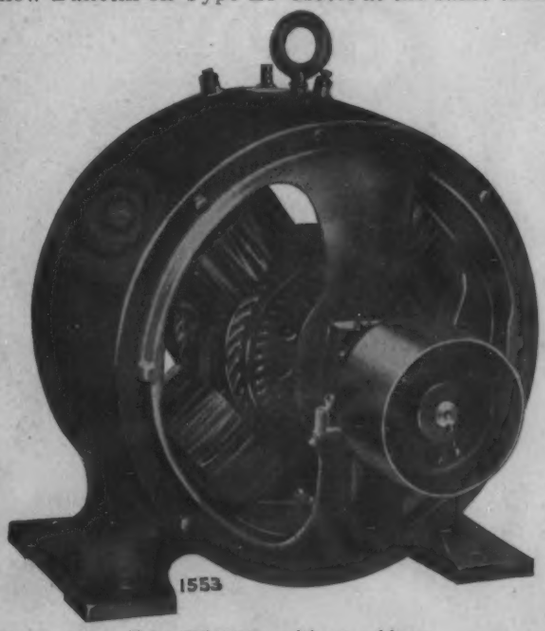


Type EF Motor without subbase

Fort Wayne Electric Works

"Wood" Systems

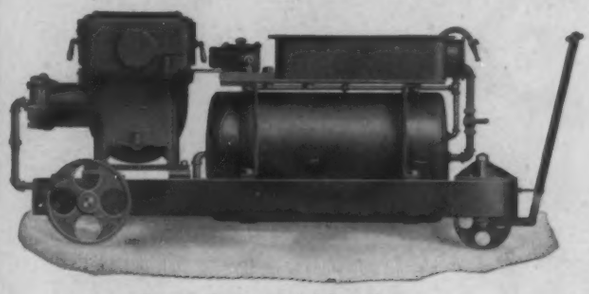
FORT WAYNE, INDIANA

San Francisco Office, : : 403 ATLAS BUILDING

539

NATIONAL

Portable Compressor Outfits



Portable Outfit with A-4 Type Compressor

¶ These outfits will be found useful for blowing dust and other accumulations out of generator coils, car motors and car seats. They are specially adapted for service in car and other shops where it is not desired to install an extensive system of piping from a centrally located plant and where compressed air is occasionally used in different parts of the building for various industrial operations, such as drilling, riveting, etc. : : : : : : :

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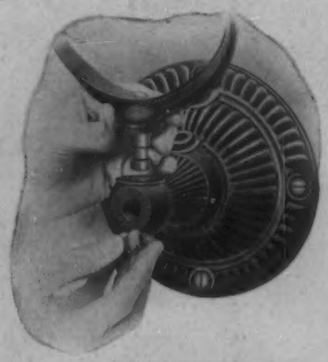

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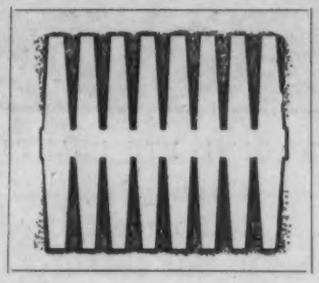

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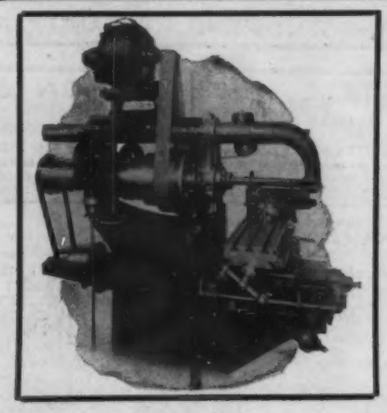

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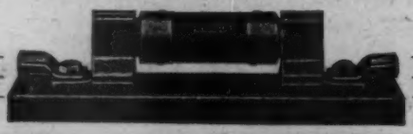

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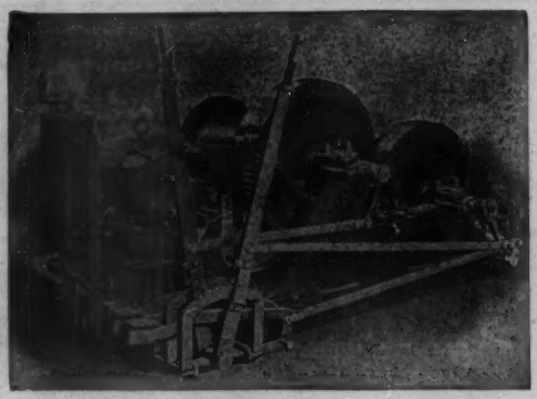

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ILLUMINATION.

Porterville, Cal.—H. S. Farnsworth, representing Los Angeles capital, arrived here a few days ago accompanied by engineer John Beal. They are looking over the field and will probably in the near future install a gas plant.

San Francisco, Cal.—The Merchants' Association of Fillmore Street has raised a fund for permanently lighting the street from McAllister to Sacramento. The system will be completed by July 4. It is to cost $10,000.

Sierre Madre, Cal.—The city trustees have decided to build an electric light plant capable of furnishing fifty sixteen candle power incandescent lights. The ordinance was passed at the last meting, and the clerk ordered to receive bids for the plant.

Long Beach, Cal.—Several prominent business men of the town are talking of a new industry for the flats west of the city. If investigations now under way meet with favorable results a company will be organized and deep wells sunk for natural gas.

Sawtelle, Cal.—The Edison Electric Company is erecting poles along Oregon Avenue preparatory to installing a substation here. The company has purchased a lot on Oregon Avenue, where a suitable building will be erected for the production of light and power in Sawtelle and vicinity.

San Francisco, Cal.—On the anniversary of the earthquake the ruined dome of the old city hall was lighted up with thousands of electric lights under the direction of the Merchants' Exchange of the city. The crowd at the exhibition was so great that traffic was blocked for an hour.

Tonopah, Nev.—B. C. Holst, representing the California Electric Co. as the Nevada agent, has recently returned from Lovelock, where he has contracted for the installation of an electric light plant which is to supply power for light in the Seven Troughs district. He says that a power and light plant will soon be built at Seven Troughs.

Saltillo, Mex.—Extensive improvements are now being undertaken by the Saltillo Electric Light Company. The capital stock has been increased to $200,000. The company has bought a large piece of land on Calle de Victoria adjoining the National Railroad tracks, and will erect thereon a $50,000 building. The machinery, which has already been ordered, is of the latest design.

Walla Walla, Wash.—Manager R. E. Allen of the Northwestern Corporation, announces that about $40,000 will be spent in improvements to the gas and electric plant. A big gas tank is to be erected and a new substation building. Automatic regulation for the power plant on the Walla

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Walla River will soon be installed. A large part of the equipment has been purchased and is on the road.

Berkeley, Cal.—The power plant which is to be installed in the new Hotel Claremont is to be one of the largest on the Coast, costing $125,000. M. P. Thye is the consulting engineer from Los Angeles who has charge of the work. There will be three engines with a combined capacity of 450 horsepower. These engines will be used for the electric lighting, steam heating, elevators, fire pumps and ice plant.

Oakland, Cal.—The Oakland Gas, Light and Heat Co. has announced that on June 1, the rate on illuminating gas will be cut from $1.15 to $1.00 per 1,000 cubic feet. Cooking gas rates will remain at 90 cents per 1,000 feet. A reduction of 10 per cent will be made in base rates for electricity, with a new schedule of discounts to large customers. Contracts have been let for new machinery and main extensions for gas and electricity amounting to $1,400,000.

Eureka, Cal.—Plans and specifications for the new gas works, which are to be erected in this city by the recently incorporated Humboldt Gas & Electric Company, arrived by the last steamer. The officials of the company will appear before the council at the next meeting and secure permission to lay mains throughout the city. The plant is to be located on a site just northeast of the electric plant of the North Mountain Power Company in the East End. The buildings are to be of steel, with galvanized iron covering. To erect the plant, install the machinery and distributing systems will call for an outlay of $100,000. The California Light & Fuel Company of San Francisco has been given the contract for putting in the plant and the entire system will be in readiness within six months.

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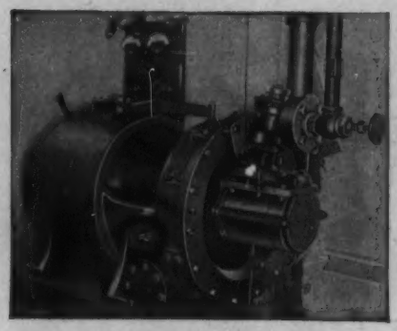

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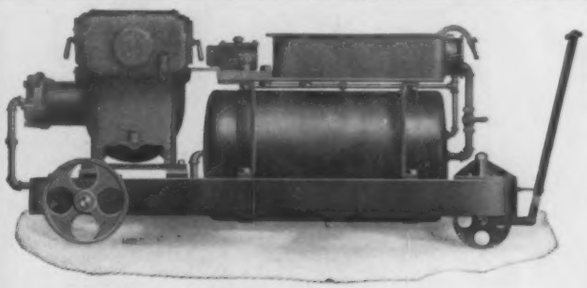

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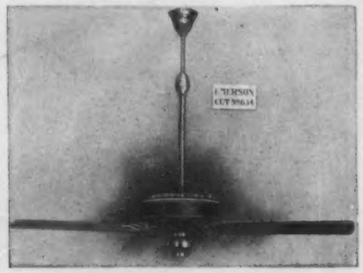

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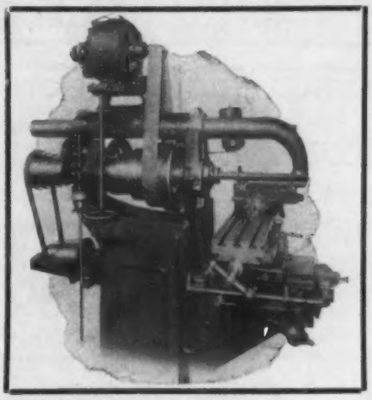

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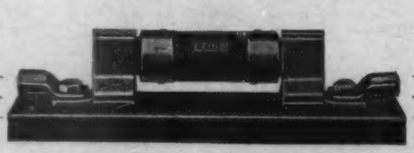

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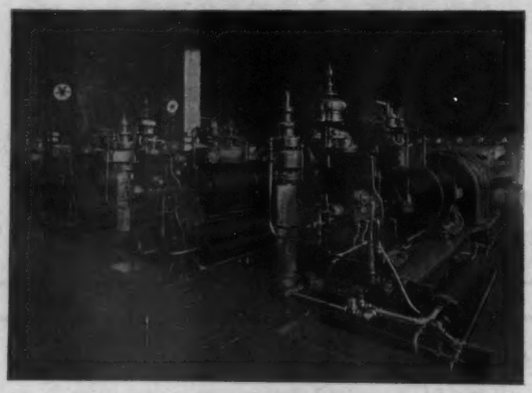

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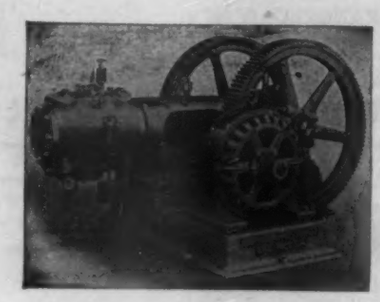

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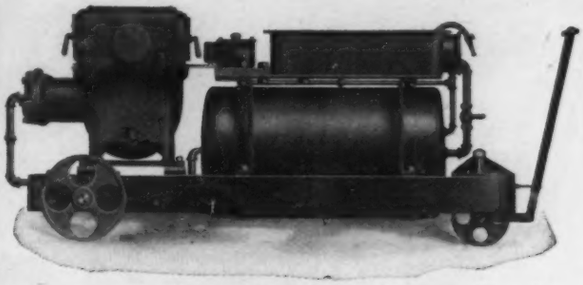

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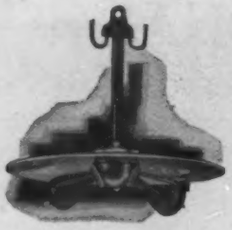

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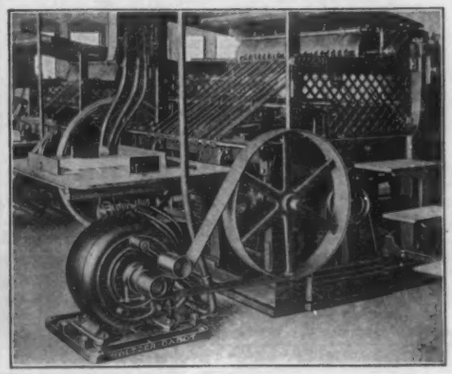

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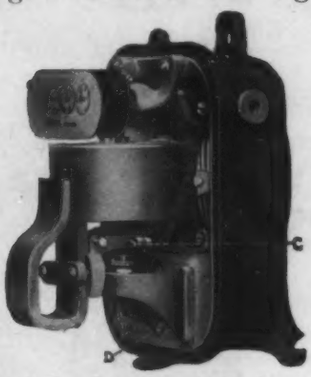

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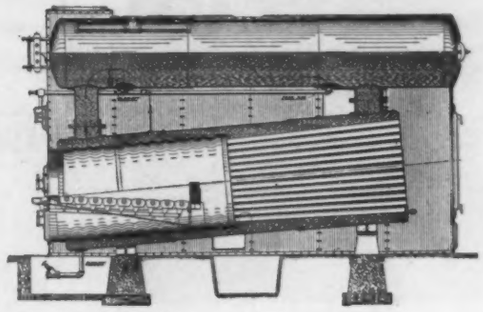

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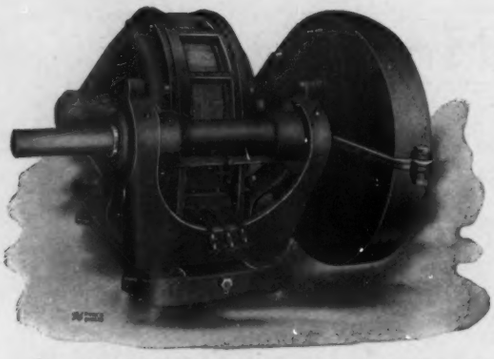

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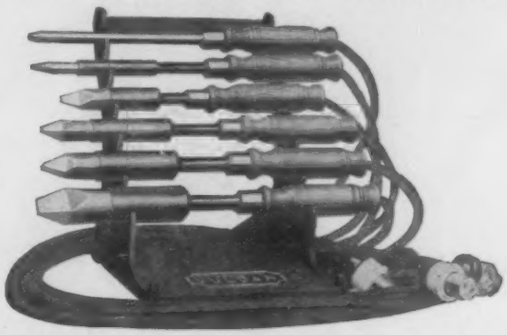

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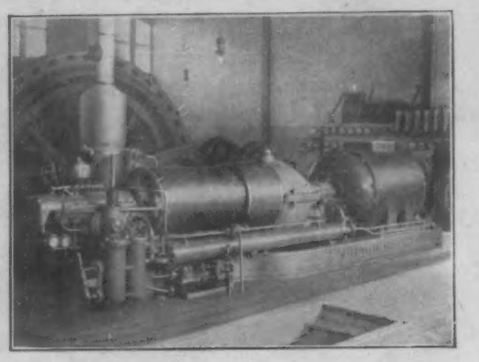

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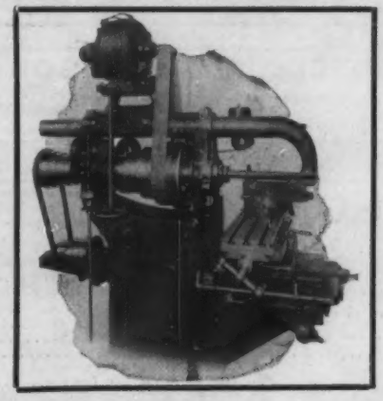

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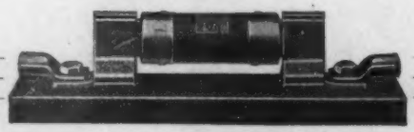

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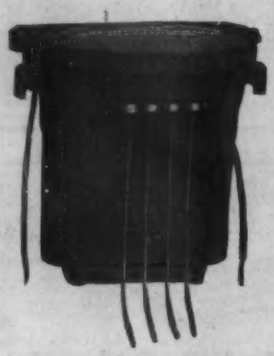

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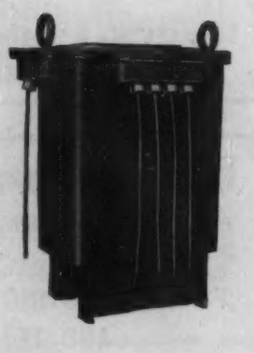

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Portland, Ore.—It is reported that the Oregon Electric Company's line to Salem will be completed in four months. The line will be forty-nine miles in length.

Walla Walla, Wash.—The Walla Walla Valley Traction Company will at once commence work on its passenger and freight depot for Milton and Freewater, one building to serve two cities.

Baker City, Ore.—Council granted a thirty-year franchise to William Pollman and associates to construct and operate an electric street railway; also to run an urban line to Rock Creek and Haines.

Snohomish, Wash.—The Snohomish Construction Company, Edward Wright, president, has been organized to construct the Snohomish Valley Railroad, the proposed electric line from this place to Seattle and Tacoma. Work will be commenced at once.

Riverside, Cal.—Formal application has been made by the Crescent City Railroad Company to the City Trustees for a franchise for the proposed trolley line that is to connect Riverside with the new cement plant now being built at Western Riverside by the Southern California Cement Co. An ordinance has passed its first reading, advertising the sale of the franchise.

Parral, Mex.—This place is to have an electric street car system in the near future. Bids for the building of a portion of the line are ordered, and $150,000, the amount of the company's present capitalization, has been fully subscribed and paid up. The name of the organization is the Compania de Ferrocarril Urbano de Parral. Juan Baustista Baca is the president.

Salt Lake City, Utah.—The street car situation here has reached an acute stage. There have been several days of negotiations between the Utah Light and Railway Company, a Harrison corporation, and its employees. The company declares that its earnings are not great enough to permit the payment of the wage scale demanded by the men—twenty-five cents per hour for first-year men and thirty cents per hour after the first year. This is fifteen per cent more than the men are now getting.

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ILLUMINATION.

Guadalajara, Mex.—J. Guillermo Dominguez, a Mexican attorney of Los Angeles, has secured from the Government of Jalisco a concession for a gas plant in Guadalajara.

Club has taken up the matter of lighting that thoroughfare from Montgomery to Market and equipping each block with two modern electric light posts, each with a cluster of four burners. The Board of Supervisors has been petitioned to assist in the work.

Berkeley, Cal.—Representatives of the conference committee of the improvement clubs of Berkeley have invited the American River Electric Company to bid for a franchise to operate a lighting plant in Berkeley. Mortimor Fleishaker of San Francisco is one of the backers of the company.

San Francisco, Cal.—The Dolores Street Improvement Club at a recent meeting resolved to help the city in the matter of lighting Dolores and Sixteenth streets. The members pledged themselves to defray the expenses of installing electric lights from Market street to Twentieth along Dolores and from Guerrero to Church along Sixteenth street. The cost will approximate $1200. On the first call for subscriptions $700 was subscribed.

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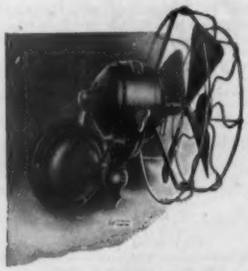

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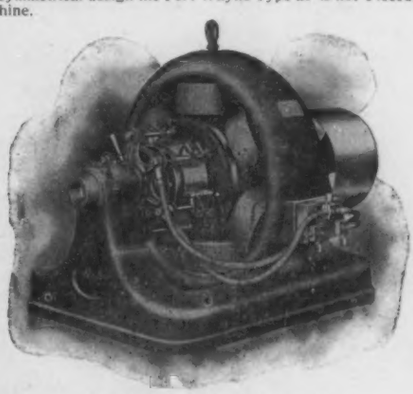

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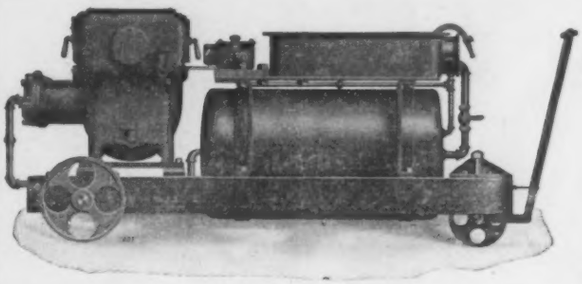

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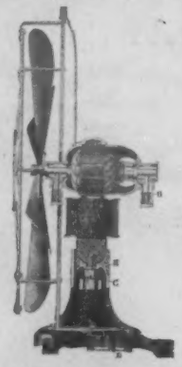

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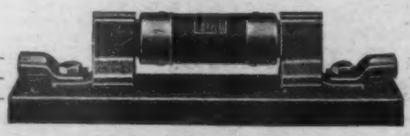

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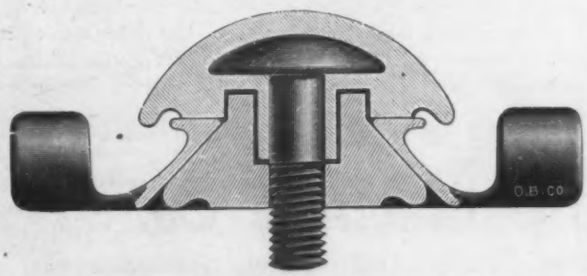

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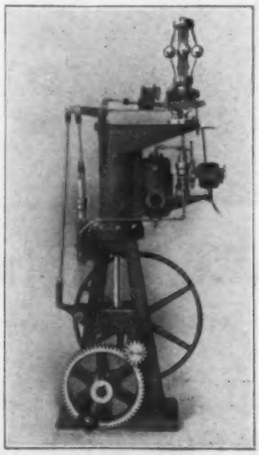

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ILLUMINATION.

Fullerton, Cal.—The Fullerton Gas Company has ordered three carloads of pipe and has commenced work on installing a gas system for this city.

Los Angeles, Cal.—Chas. Orpin is at the head of a syndicate which will establish a gas plant at Searchlight, Nev. Crude oil will be used to produce the gas.

Seattle, Wash.—The Seattle Lighting Company wants a franchise to manufacture and distribute gas at Georgetown. F. K. Lane, the manager of the company, is taking up the matter with the Georgetown Council.

Eureka, Cal.—The Humboldt Gas and Electirc Company has been granted permission by the City Council to install an illuminating gas distributing system in Eureka. The company is a branch of the North Mountain Power Co.

Tacoma, Wash.—W. A. Aldrich, the general manager of the gas works, has given the information that he is actively preparing to extend the gas mains and that South Tacoma will have a gas system, to be installed at once at a cost of $60,000.

Escondido, Cal.—D. F. Garrison, president of the First National Bank of San Diego, Herbert Engle, C. H. Burlock and Clark Braley, capitalists of San Diego, were in the valley a few days ago with a view of putting in an electric power and lighting plant for the city and valley.

Santa Maria, Cal.—At a meeting of the City Board of Trustees last week the Santa Maria Gas and Power Company made application for a franchise which will enable it to put in an independent electric light and power plant in connection with the gas it now supplies for heat and fuel purposes. This is in opposition to the Valley Electric Company, against which there was considerable complaint in the past because of the service and the high rates charged.

Alturas, Cal.—Arrangements are being made by the Alturas Electric Light and Power Company to put in a larger waterwheel for its plant than the one at present driving the dynamos on Pine Creek. Other parts of the machinery will also be enlarged to correspond. This change is necessitated by the increased demand for power and light in Alturas, but more particularly by the new system being installed at Cedarville.

Los Angeles, Cal.—The City Gas Company, of which A. Ross is the general manager, has applied for a permit to erect a building on the twenty acres of land it has purchased in the Huntington Park Extension No. 2. The company proposes to lay the foundations at once and expend $400,000 on the plant. Much of the material has been purchased. The company has contracted with the Stacy Manufacturing Company of Cincinnati for two holders. The mains will be laid as soon as the work is commenced on the plant.

Los Angeles, Cal.—The Fuel Oil Gas Company has signed contracts and begun the installation of its system after thorough public demonstration. Its distillate generators manufacture oil gas upon the premises at the rate of commercial gas, but the industry will boost the refining business. The company is building tank wagons for delivery.

Santa Maria, Cal.—At the meeting of the City Board of Trustees last week the Santa Maria Gas and Power Company made application for a franchise which will enable it to put in an independent electric plant in connection with the gas it now supplies for heat and fuel purposes. This is in opposition to the Valley Electric Company, which is now supplying the town with electricity.

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OIL.

San Francisco, Cal.—At the offices of the Southern Pacific and Santa Fe it has been announced that a change has been made in the rate on refined oil from points east of the Missouri River to the Pacific Coast. The former rate was 78½ cents per 100 from Chicago, with a charge of $105 for the return of the empty car. The new rate is 90 cents per 100, with no charge for the return of the car. The effect of this change is to reduce greatly the freight rate on refined oil. The new rate was put into effect following a protest made to the Interstate Commerce Commission by oil men of Pennsylvania and Ohio.

Fresno, Cal.—Among the independent oil operators there is a plan on foot for the construction of a pipe line from Kern River through Coalinga to tide water near San Jose. Unless the Standard, the Associated and the Southern Pacific come to terms they state that this plan will surely be carried out. The freight being paid by the Standard and the Associated has gone up steadily, and the independents think it is time to put a stop to it. Last week a meeting was held in Coalinga beween the Fresno County independents and a committee of five from Bakersfield. The matter will be taken up again in a week. Two years ago the Producers' Union obtained a right of way for a pipe line running from Coalinga to tide water. This will be used for a part of the route.

Portland, Ore.—According to Captain E. W. Spencer, oil has been discovered on Fifteen Mile Creek, five miles above Dufur, Ore. Captain Spencer says: "I had heard talk about oil oozing out of the ground along Fifteen Mile Creek for some time and thought I would take a few days off and look the field over. The reports have been exaggerated. I found plenty of indications that led me to believe that there was good merchantable oil there. The formation of the soil, which consists of sandstone and shale, is such as one would naturally expect in an oil country, and is very similar to that found in West Virginia, with which I am quite familiar. I am inclined to think that the oil along Fifteen Mile Creek is of a very much lighter grade than that found in California, but I haven't gone far enough into the analysis to state this with certainty."

Bakersfield, Cal.—It is persistently rumored among oil men of authority that the Associated Company has crowned its recent thirty-cent contract with the McKittrick producers with a renewal of the former contract with the Southern Pacific Company to sell this same oil to the railroad for fifty cents a barrel. No confirmation of this rumor can be obtained from the Associated, but it is considered very probable by oil men that the deal has been made. The old contract with the Southern Pacific expired in April. With the increased demand for fuel oil and nearly all of the fluid tied up by contracts, an even higher price than that named is to be considered soon.

Dearborn Preparations KEEP BOILERS CLEAN. —— GET OUR PROPOSITION.
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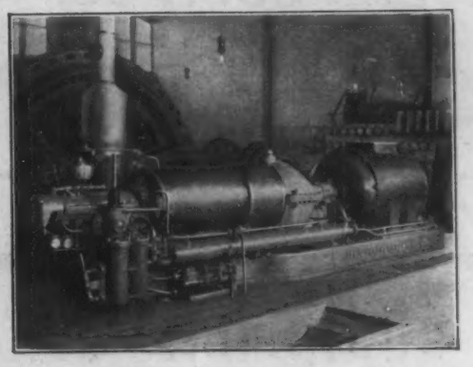

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¶ There is perfect balance of the rotating parts, both in the turbine and the generator, resulting in a minimum of vibration, quiet operation of the generator and remarkable coolness of the bearings, which are continuously and automatically lubricated. The revolving parts are designed for high peripheral speeds, with ample provision for ventilation. There is high steam economy, even at rapidly fluctuating loads, and the expansion is complete. These turbines are adapted to high steam pressures and superheat. They have a large overload capacity.

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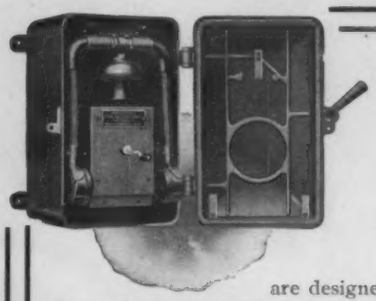

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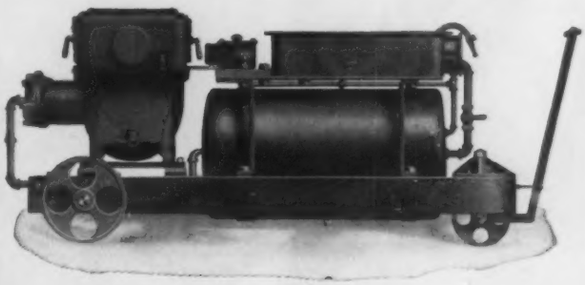

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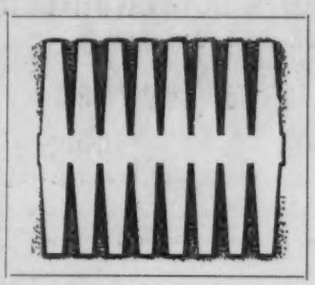

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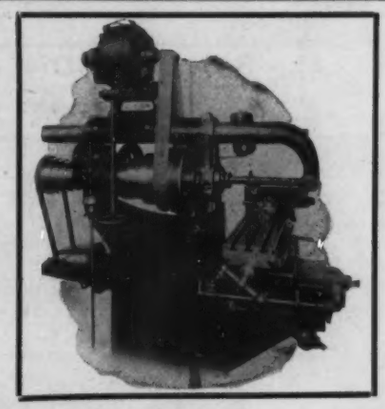

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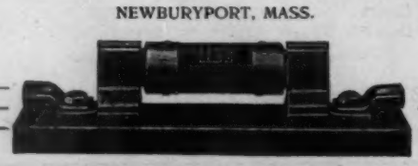

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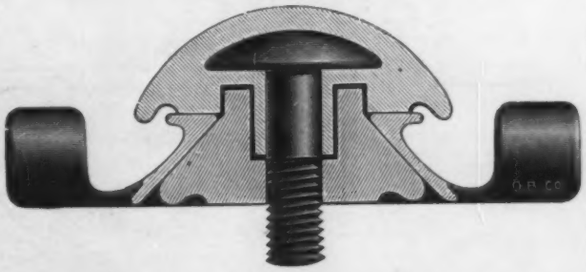

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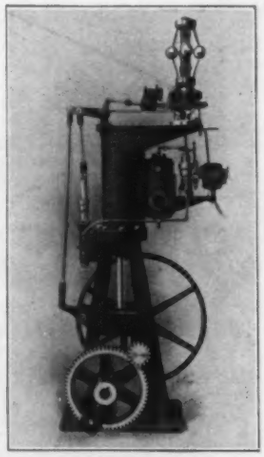

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the cars of the American Lake and city lines temporarily. The Pacific Traction Company is making plans for the most elaborate system of car barns and quarters for the men on the Pacific Coast. The sites for all the buildings have not been announced, but it is understood that the main buildings and headquarters of the company will be near the center of the city. The company is now laying double tracks on Pacific avenue, paralleling those of the Tacoma Railway and Power Company.

Prairie Development Company—Judge W. W. Wood has decided that the Prairie Development Company, financed by D. K. McDonald, R. A. Hutchinson, Mark F. Mendenhall and J. Grier Long, who are back of the Spokane-Pend d'Oreille Rapid Transit Company, are the owners of 1500 acres of land on the shores of Lake Pend d'Oreille in Idaho, east of Spokane, the verdict being against F. A. Blackwell, chairman of the board of the Spokane and Inland Empire Electric Railway Company, and the Liebergs, who sold the land for $41,000 to the company and after the first payment was made did not appear to collect the balance. Mr. Blackwell then paid $5000 more than the company did and agreed to protect the Liebergs from suit. The court has ordered the Liebergs to carry out their contract. Mr. Long gave out this statement: "Upon the termination of the suit, we will begin building our line from Spokane to the lake, 46 miles. We have been held back for about a year by this deal, but feel now that work can be started. We did not care to risk the money of our stockholders while the land was in litigation, nor did we care to run the road to develop property owned entirely by other people."

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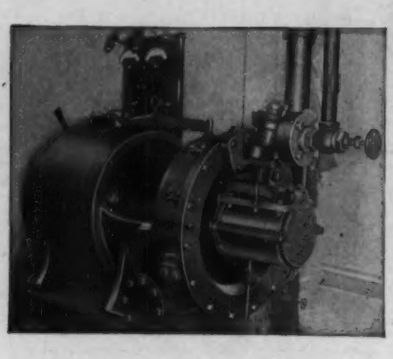

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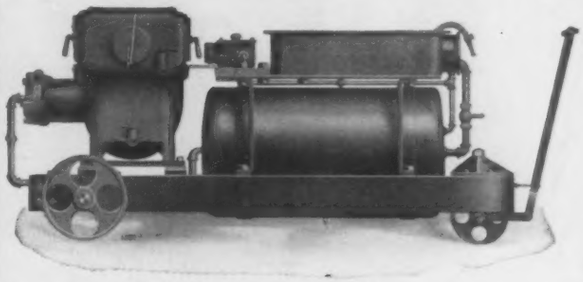

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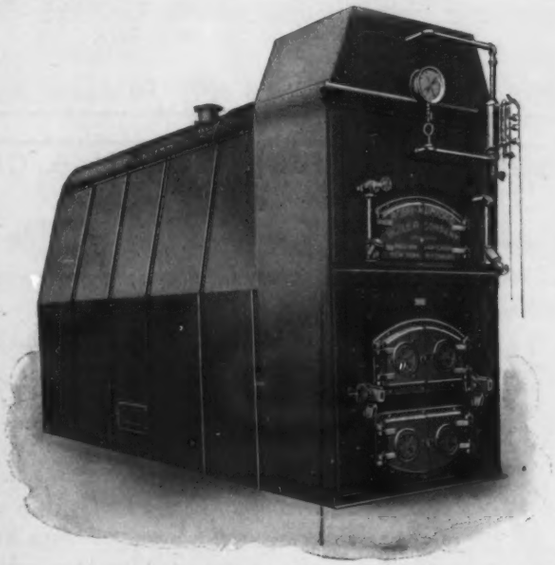

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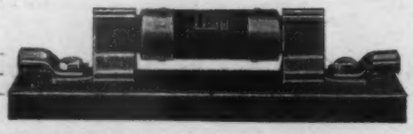

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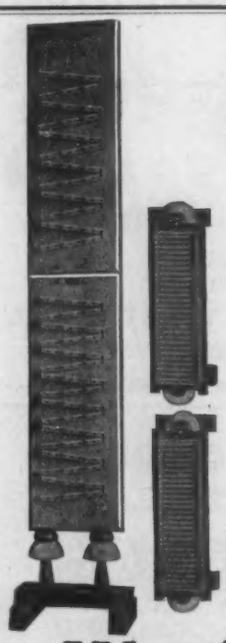

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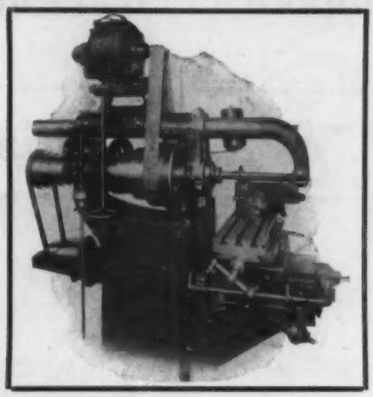

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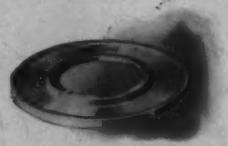

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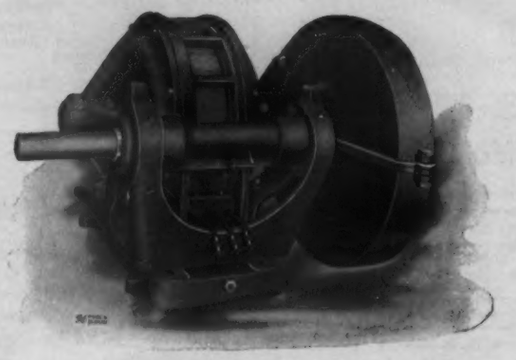

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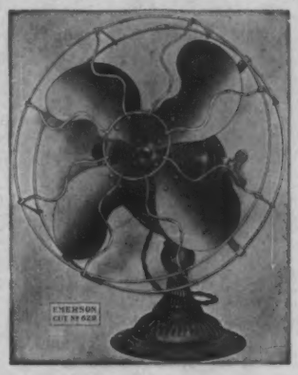

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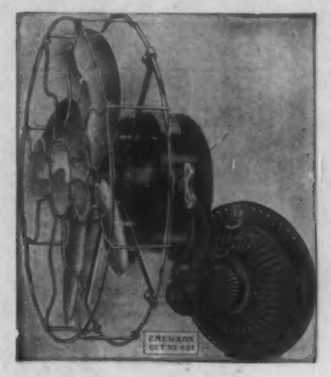

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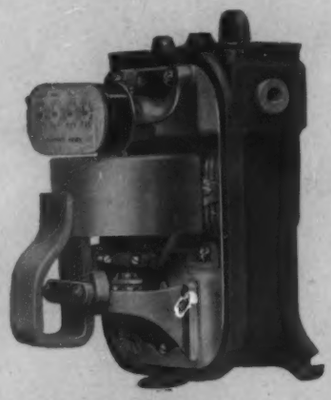

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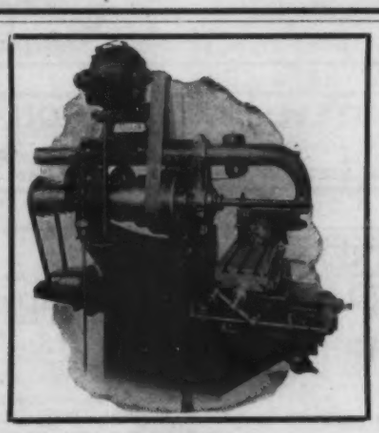

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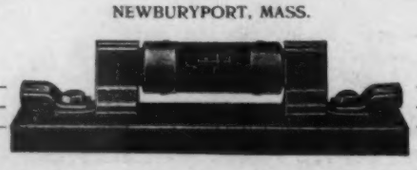

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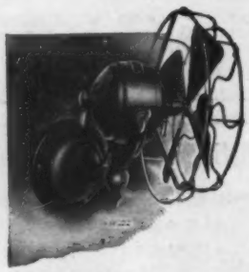

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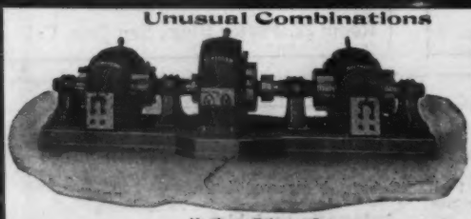

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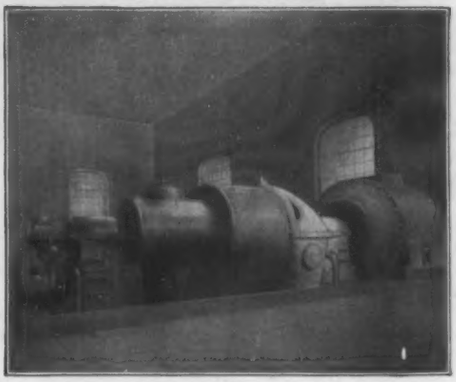

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— FOR OTHERS SEE OUR BULLETIN NO. 1054 —

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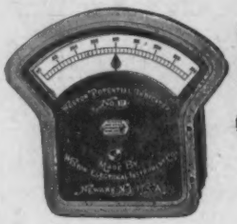

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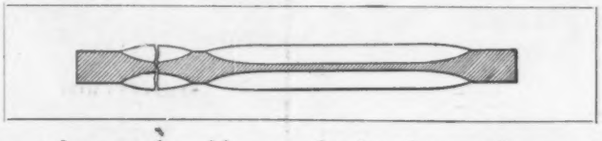

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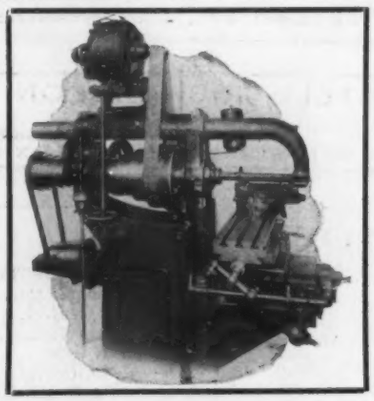

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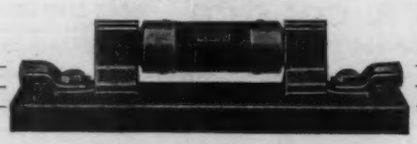

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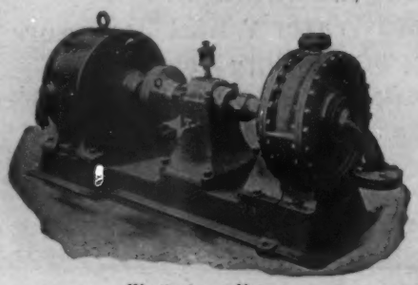

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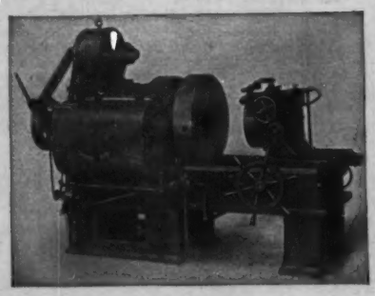

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TRANSPORTATION.

El Paso, Tex.—The electric line between El Paso and Las Cruces is now assured. Chicago parties are back of the enterprise. Application for a franchise will be made in a few days.

Los Angeles, Cal.—Residents of Euclid Heights and the southern half of the Ninth Ward are jubilant over the possibility of early operation of electric cars in that section of the city, out Hollenbeck Avenue and on to Whittier.

Portland, Ore.—With the announcement of building an electric line from Portland to Ranier, the Ranier Electric Company has been organized, with a capital stock of $25,000. Articles of incorporation were filed last week. The principal offices of the corporation will be at Portland. The incorporators are Alex Sweek, Carleton Lewis and W. C. Morris.

Fresno, Cal.—Manager A. G. Wishon, of the San Joaquin Power Co., has returned from Crane Valley, where he went to inspect the work in progress there. He reports that the survey for the electric line to Yosemite Valley will be completed in two or three days more. This will mark the close of the preliminary stage of the mountain line. The financing of the project will be cared for by the Huntington main office in Los Angeles.

Napa, Cal.—The work on the extension of the Vallejo, Benicia and Napa Valley Electric Railroad is progressing rapidly, and already three miles of track, which will eventually extend to St. Helena, have been completed. The delayed arrival of the material for the road has changed the plans of the company officials, who had expected to have the cars in operation up the valley by June 1st. The first car will be sent north from this city on July 4th. The construction of this line is being watched with much interest by the residents of this as well as of Lake County, for it will open up the resources of both.

San Francisco, Cal.—Nothing can be done toward the construction of a municipal conduit electric power street car system on Geary Street during the next two or three weeks. Supervisor Gallagher says: "The budget, passed to print last week, will have to receive the Mayor's approval. We do not thing that he will veto the bill, as the measures of rehabilitation provided for in the budget have his warm support. Not until the Monday after the budget is adopted and approved will the Supervisors be in a position to give the engineers permission to go ahead."

Long Beach, Cal.—The Pacific Investment Company, of Los Angeles, has closed a deal by which it comes into possession of twenty acres of Seventh Street. The land is along the old right-of-way secured several years ago for a steam railroad. This right-of-way now belongs to the Pacific Electric Company, and it is reported that a line will be constructed entering the Alamitos district northeast of Signal Hill. It is said that the line will connect with the Monrovia line from Downey, and that residents of the latter city will give a $25,000-bonus to have the road constructed through the town.

Boise, Ida.—Water filings made in the office of the State Engineer indicate that it is the purpose of the Chicago, Milwaukee and St. Paul Railway Company to run its proposed line over the Bitter Root Range, between Montana and Idaho, by electricity. The filings were made in the name of the Idaho Water and Electric Power Company, just organized. They cover the waters of the St. Joe River and the north fork of the stream. The filings were made by I. N. Smith, of Lewiston, attorney for the railway interests. The water is to be used over and over again, according to the plans and specifications filed in the State Engineering Department, no less than sixteen dams being provided for. These, with the other works, will cost $923,000, and the sixteen plants will generate 46,000 horsepower.

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TRANSPORTATION.

Berkeley, Cal.—Surveyors of the Oakland Traction Consolidated are running lines for the new cross-town road on Dwight Way. This line will be double-tracked in order to give fast service on this street to the bay. The line will begin at the corner of College Avenue, run down Dwight Way to Sixth Avenue, thence to University Avenue and down this to the bay. By this route the Dwight Way cars will cross every traction line in Berkeley. Another franchise held by the Traction Company is one beginning at the Claremont Hotel at the head of Russell Street, along Russell to Hillegass Avenue, to Ashby Avenue, to San Pablo Avenue. Work on this line will be commenced shortly.

Marysville, Cal.—The Northern Electric Company has commenced laying rails south from Marysville on the extension of its electric railroad toward Sacramento. A short delay will occur while the bridge across the south channel of the Yuba River is being completed, but construction trains will run to Sacramento by August 1st, and passenger service is to be established by September 1st. Trains will run each way every two hours. Five additional coaches are now being built for an extension of the service.

Newport, Cal.—O. H. Finley has received instructions from Port Orange to proceed as quickly as possible with the work of surveying a route for the proposed electric line from Old Newport Harbor to Santa Ana. The work is already under way.

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ILLUMINATION.

Vallejo, Cal.—Sealed bids are being received by the Board of Supervisors for the sale of a franchise to erect poles and wires for transmitting electricity for light, power and heat. The transmission system is to run over certain highways in Solano County.

St. Helena, Cal.—An ordinance has been passed by the Board of Trustees granting to Harry W. Pittman, of Calistoga, a franchise to construct, operate and maintain an electric light and power line. Mr. Pittman is given four months in which to begin construction, and twenty-four months in which to complete the system.

Berkeley, Cal.—The Berkeley Electric Lighting Company, branch of the Oakland Gas, Light and Heat Company, has announced extensive improvements soon to be made in Berkeley, including the erection of a $150,000 electric sub-station at the southeast corner of McGee Street and Hearst Avenue. The dangerous high tension wires on Grove Street will be moved to University Avenue and placed in conduits. The new sub-station will cover nearly an entire block. An expensive 250-kilowatt motor generating plant will be put in. The erection of the plant has been made necessary because of the heavy demands for power in Berkeley. John H. Pape, who has been connected with electric lighting in Berkeley for nineteen years, will be the superintendent of the new station.

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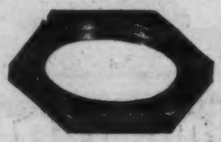

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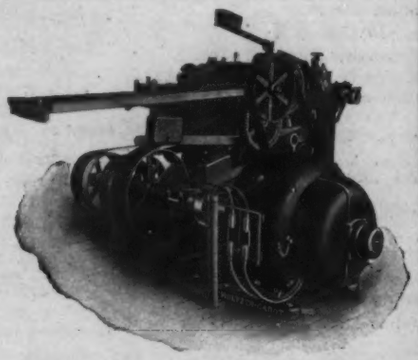

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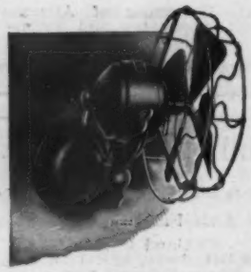

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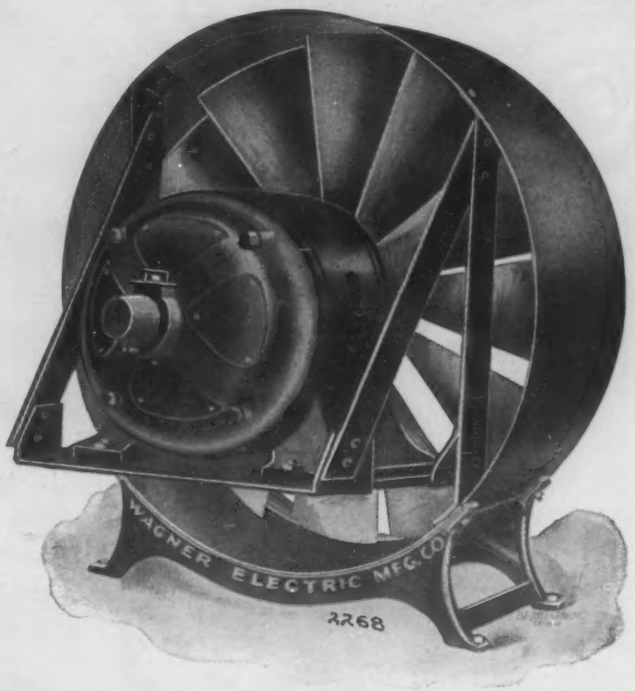

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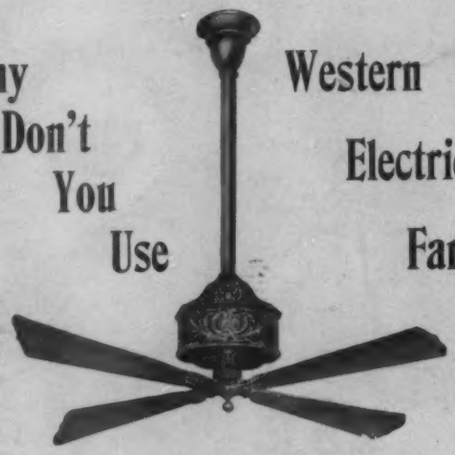

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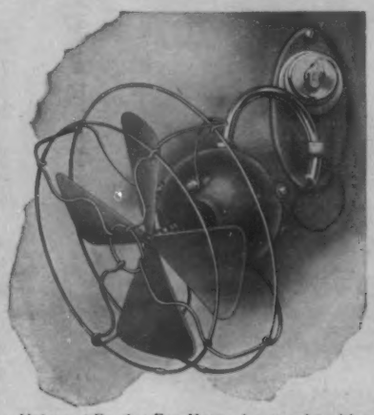

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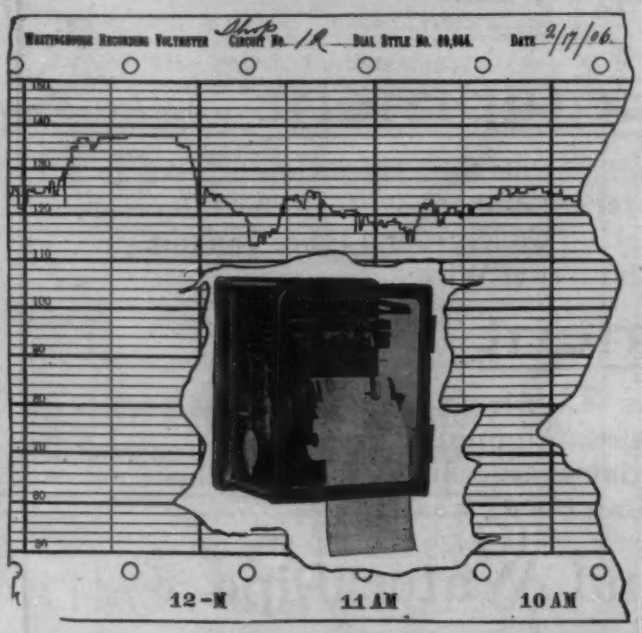

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FINANCIAL.

San Francisco, Cal.—The Spring Valley Water Company has filed, in the United States Circuit Court, a suit against the City and County of San Francisco and the Board of Supervisors, asking that defendants be restrained from enforcing the water rate established by the Supervisors. This is the fourth suit of the same kind that the company has filed since the water rates were made in 1903.

San Francisco, Cal.—The Executive Committee of the Allied Commercial Association, which has undertaken the solution of the difficulties between the Spring Valley Water Company, its rate payers and the city, has received from the water company an offer for the sale of its entire plant to the city, in accordance with the plan of long-term option adopted at the first meeting of the committee. The exact sum for which the Spring Valley Water Company agrees to deliver all its property to the city is not available for publication, but it is known that it is approximately the total par value of the bonds and stock of the corporation, which amount to $34,000,000. Various estimates have been made on the value of the property, both by the company's engineers and the experts employed by the city. The lowest appraisement was $24,000,000, and the highest $51,000,000, but it is sufficient that the mean of these estimates is approximately $34,000,000, which is the sum of the outstanding securities of the corporation, and, it is understood, very nearly the amount at which the Spring Valley now offers the city a ten-year option on its entire plant. While the market value of the stocks and bonds only foots up $24,000,000, it is contended that a court, if asked to pass on the question, would, in all probability, strike an average of the various estimates and arrive at the decision that $34,000,000 was a fair valuation.

ILLUMINATION.

Los Angeles, Cal.—The Town Trustees of Vernon have refused permission to the City Gas Company to erect a plant within smokeless precincts of their model little city. They are searching for a new location.

Lodi, Cal.—Actual work has been commenced on the gas plant for this city. A force of men is laying six-inch pipe along Sacramento and Elm Streets, from which points smaller pipes will be laid. The plant will cost $75,000, and will be completed about October 1st.

Napa, Cal.—W. J. Lindow has been granted a franchise to erect and maintain an electric light system along and across the city streets. Under the decisions of the Court the franchise does not have to be published or advertised for sale, and Mr. Lindow can commence the work of placing the poles at any time.

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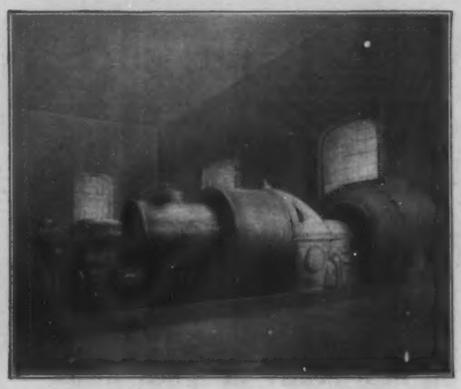

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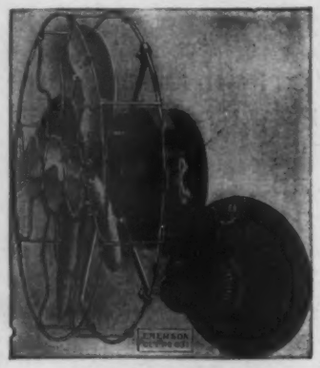

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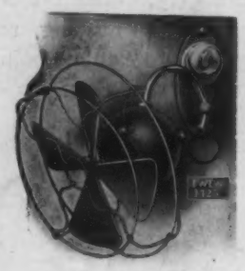

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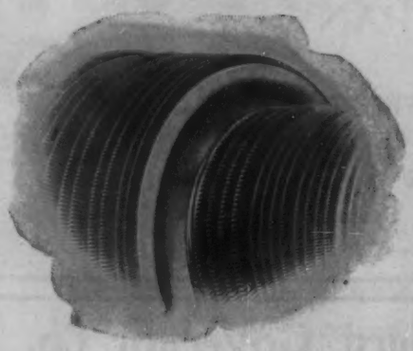

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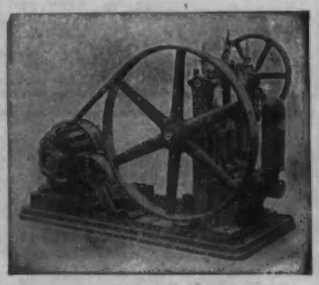

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ELECTRIC RAILWAYS.

Pasco, Wash.—Gus Harras has made application through his attorney, J. W. Brooks, of this city, for an electric railway franchise through the streets of Pasco, where Mr. Harras has extensive property interests.

Rosalia, Wash.—Work of extending the Spokane & Inland Electric Railway, which has been practically suspended since February, was actively resumed this week and construction crews have been transferred from the east to the west branch. It is probable that the laying of steel to Colfax will be completed by August 1, and regular service installed by October 1.

Lewiston, Ida.—A. P. Cahill, of Dayton, Wash., one of the directors of the Columbia & Walla Walla Traction Co., which is financing the building of an electric line from Wallula, Wash., to Lewiston, states that the company has the right-of-way for the line secured from Wallula to Dayton, and that work on this part of the road will begin this year. The matter of securing the right-of-way from Dayton to Lewiston will be taken up as soon as possible.

Everett, Wash.—A deal involving more than $1,000,000 and the construction of an electric railway system from Tacoma to Vancouver, passing en route through Bellingham, was closed this week, when Stone & Webster purchased all the holdings and franchises of the Everett Electric Company. This transfer, carrying with it about twenty-four miles of road, fine power houses and valuable suburban franchises, insures the long-talked-of Tacoma-Vancouver line, and will serve to make Bellingham one of the greatest trading centers in the Northwest.

GAS.

The Lodi Gas Company, of which Mr. Henry Keyes, of Sacramento, is general manager, expects to have their plant completed by October the first. The expenditure involved in this construction is put at $70,000.

Endeavors are being made in Germany to produce a new kind of steel improved by a certain percentage of metallic calcium, which, it is said, gives some very desirable qualities to the product. Certain metallurgists have long expected this new steel, and the actual experiments are being made to confirm or finally disprove this theory. Processes to extract metallic calcium from certain ores, in sufficient quantity and at a cost suitable for industrial purposes, have been invented at the Bitterfeld Electrotechnical Works (Prussian Saxony). A series of experiments are now being made with calcium thus prepared by the works in question and several firms manufacturing steel in Westphalia and the Rhine district. According to the German Press, results do not seem to have been satisfactory. A report was published in "Metallurgie," based upon the extensive studies and experiments made by an eminent specialist. "By these experiments," it says, "it is demonstrated that metallic calcium does not combine with iron in the molten form. Consequently its employment for iron alloys is impracticable."

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ELECTRIC LIGHTING.

E. B. Hillman has asked the town of Sidney, Iowa, for a franchise for an electric lighting plant.

The Home Light, Water and Ice Company of Blooming Grove, Tex., has been capitalized at $30,000.

The San Francisco Gas and Electric Company has ordered a 5000-kilowatt, 3-phase generating unit for its main power station in the Potrero district. It consists of a Curtis steam turbine and a General Electric 11,000-volt generator. It is understood that one of the present 1500-kilowatt units will be removed from the station and rebuilt for use in the Pacific Gas and Electric Company's new 3000-horsepower steam relay plant at Petaluma. An additional 500-horsepower exciter will be installed in the Potrero station, making the net gain in generating capacity by the changes about 3000 kilowatts.

A mortgage deed of trust for $7,500,000 from the Baltimore Electric Company to the Northern Trust Company of Philadelphia has been filed. It conveys all the land and property, including plants and all equipment, franchises and all the income and profits of the Baltimore concern to the Philadelphia corporation in trust. The deed also includes the bonds of the Maryland Telephone and Telegraph Company. This transaction completes the plan of consolidation and capitalization of the Baltimore Electric Company, which recently was formed by the merging of the Baltimore Electric Power Company and the Maryland Telephone and Telegraph Company.

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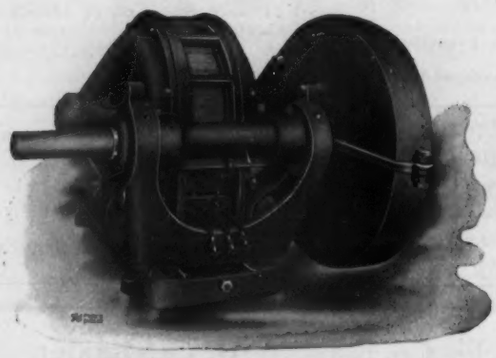

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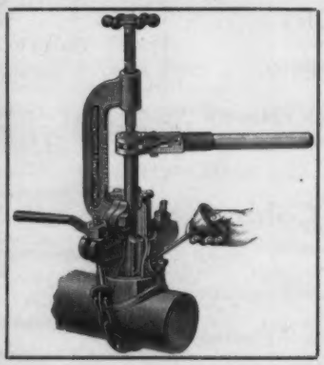

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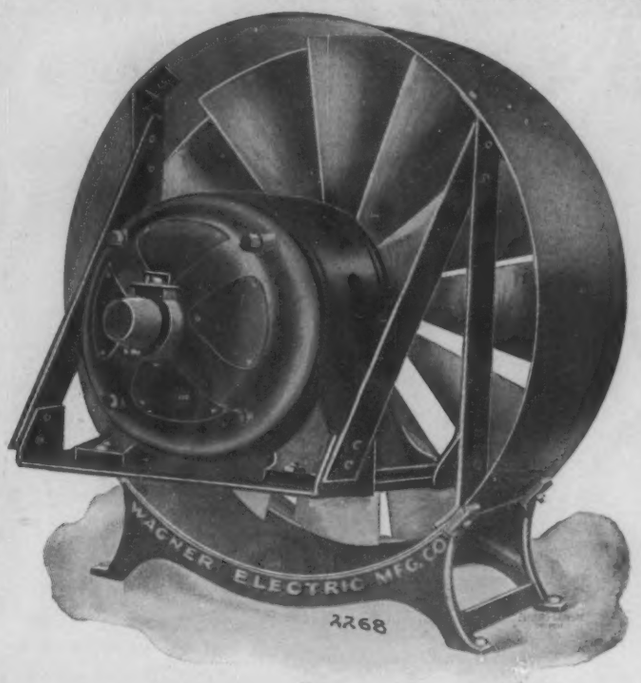

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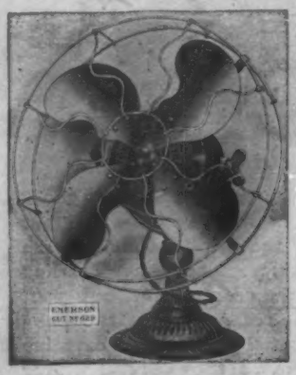

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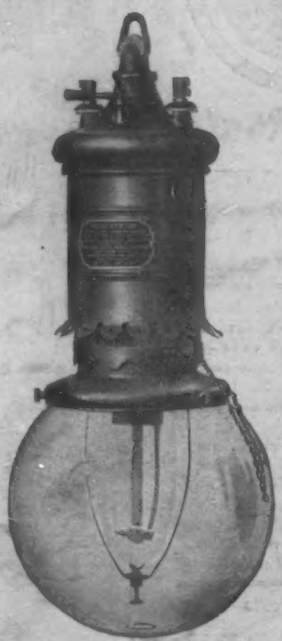

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